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Construction Methods

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CONCRETING RUNWAYS IN 20-ft. strips for control of free moisture

MARCH
1942

Paving Airport Runways • Bagged Sand-Asphalt Mix for Bombing Barricades • Inflated Forms for Concrete Houses • Soil-Cement Motor Parking Areas • Rock Tunneling for Highway Route

Inland is Building Blast Furnaces To Help Win the War

We're building three huge blast furnaces to help win the war! They are a part of the government's program to provide more pig iron and to help overcome the shortage of steel scrap.

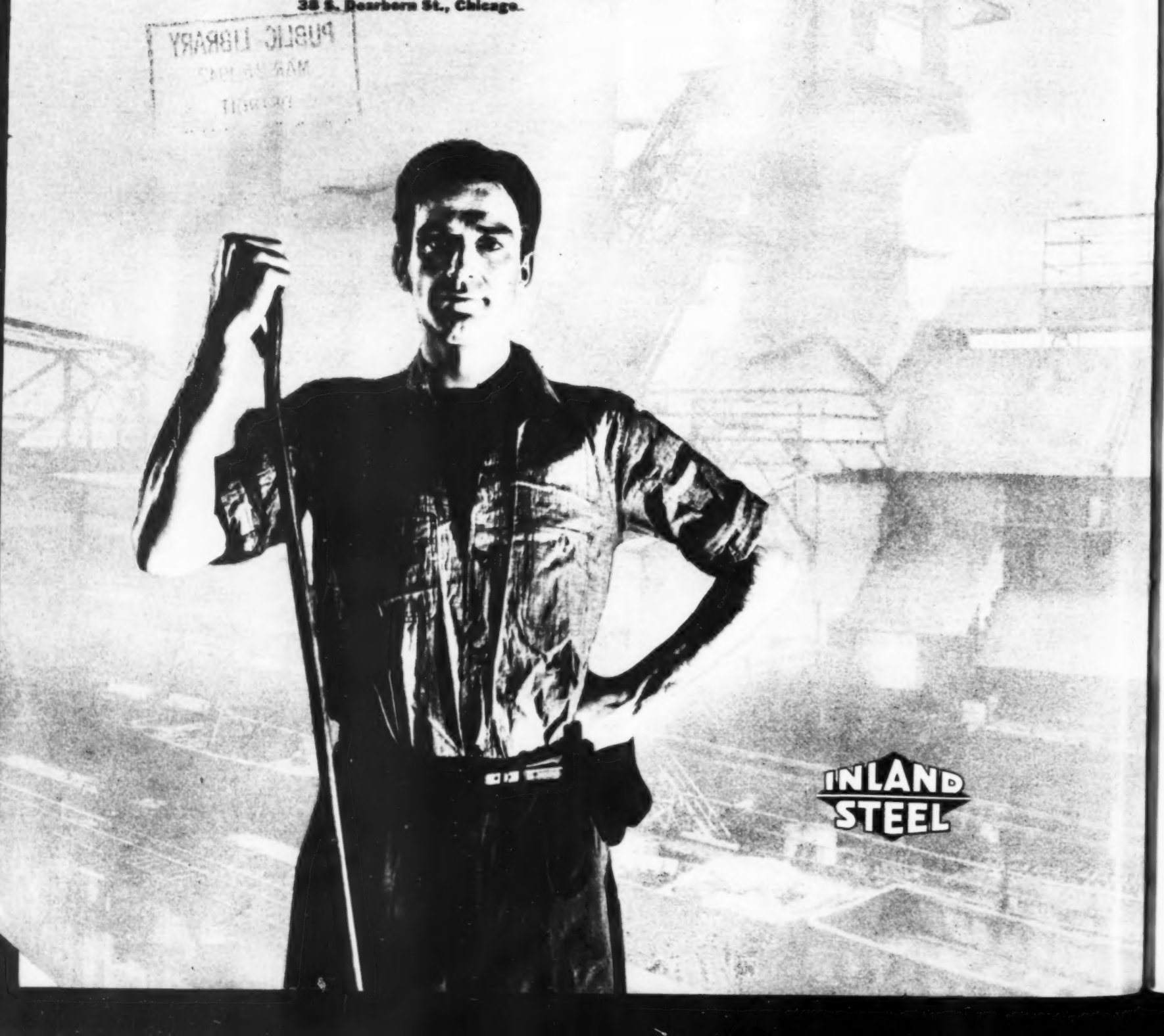
One will be our own furnace—built with our own funds—and will be located at our Indiana Harbor Works. The iron from this furnace will be used to maintain and augment our steel-making operations.

Close by the Inland plant—on government-owned property—we are constructing the other two blast furnaces—as well as coke ovens, docks and all else needed to produce 900,000 tons of pig iron annually. Inland is the agent of the Defense Plant Corporation in building this plant. It will be owned by the government and leased to Inland. After the war the government will dispose of it to its best advantage.

Thus, in construction, as well as in production, Inland's men and facilities are devoted wholeheartedly to our country's primary objective—the speedy and victorious conclusion of the war.

INLAND STEEL CO.

38 S. Dearborn St., Chicago



CURRENT JOBS

.... and Who's Doing Them

BUILDING

Public—In Braggs, Okla., **Manhattan-Long Construction Co.**, of Tulsa, will construct Army cantonment for $28,419,699. Bids were submitted for anti-aircraft training camp contract in Ozark, Ala., by **J. A. Jones Construction Co.**, of Charlotte, N. C., **Smith-Pew Construction Co.**, and **MacDougald Construction Co.**, of Atlanta, Ga., for approximately $25,000,000. War Department awarded $23,000,000 contract for embarkation camp at Stelton, N. J., to **George M. Brewster & Sons, Inc.**, of Bogota, and **John A. Johnson & Sons**, of Brooklyn, N. Y. Low bid of $26,019,036 for cantonment in Blackstone, Va., was received from **Grannis, Higgins, Thompson & McDevitt Co.**, of Charlotte, N. C., by War Department. **The Austin Co.**, of Cleveland, Ohio, received a $20,000,000 War Department contract to construct plant for Douglas Aircraft Co., Inc., near Oklahoma City, Okla. Another War Department contract for plant construction in Lewiston, N. Y., went to **J. G. White Engineering Corp.**, of New York, for approximately $20,000,000. In Cleveland, Ohio, coke ovens will be erected by **Koppers Co.**, of Pittsburgh, Pa., for $14,000,000, to be financed by Defense Plant Corp. A $12,000,000 contract was awarded to **R. P. Farnsworth & Co., Inc., Stevens Bros.**, and **The Miller Hutchinson Co., Inc.**, of New Orleans, for army replacement camp in Gretna, La.

Contract for American Steel Foundries Co. plant addition in East Chicago, Ind., went to **Thorgersen & Ericksen Co.**, of Chicago, Ill., at estimated cost of $10,000,000. A bid of $10,000,000 obtained a munitions plant contract in Forest Park, Ill., for **R. C. Wieboldt Co.**, of Chicago; Defense Plant Corp. will finance. For plant addition at Weldon Spring, Mo., bid of $10,000,000 obtained contract for **Fraser, Brace Engineering Co., Inc.**, of New York. **United Engineers & Constructors, Inc.**, of Philadelphia, Pa., received an $8,000,000 power plant contract in Cleveland, Ohio, to be financed by Defense Plant Corp. Construction of two industrial buildings in Braddock, Pa., is under way by **Arthur G. McKee & Co.**, of Cleveland, Ohio, at cost of $6,000,000, to be financed by Defense Plant Corp. Successful bidders for contract for plant expansion at Des Moines, Ia., were **Weitz Co., Inc.**, and **McLaughlin Bros.**, both of Des Moines, and **Central Engineering Co.** and **Priester Construction Co.**, of Davenport, with bid of $8,500,000.

HEAVY CONSTRUCTION

Douglas Dam, in Tennessee, is under construction by **Tennessee Valley Authority's** own forces for $30,000,000. The Center Hill Dam in Tennessee will be built by **Massman Construction Co., Hamilton Construction Co.**, and **Metcalfe Construction Co.**, all of Kansas City, Mo., at estimated cost of $25,000,000. Bid of $12,000,000 obtained shipyard contract near Vancouver, Wash., for **Gilpin Construction Co.**, of Portland, Ore. Low bid of $11,376,080 was submitted by **Dravo Corp.**, of Pittsburgh, Pa., for Bluestone Dam contract in West Virginia. Contract for additional facilities for Naval Air Station in Jacksonville, Fla., was awarded to **The George D. Auchter Co.** and **Batson-Cook Co.**, local contractors, for $3,500,000. **Morrison-Knudsen Co.**, of Boise, Idaho, will construct the Dale Hollow Dam in Tennessee, for approximately $14,000,000. A bombardment base in Greenville, S. C., will be under way by **Daniel Construction Co.**, and **Anderson**, and **A. J. Guiont & Co.**, of Charlotte, N. C., at a cost of $2,418,393. Contract for removing ledge rock and other material from Delaware River Channel and construction of 5,200-ft.-long timber dike was awarded to **Dunbar & Sullivan Dredging Co.**, of Detroit, Mich., for $2,668,778. Successful bidders for flying field contract in Roswell, N. M., were **Nolan Bros., Inc.**, and **C. A. Wagner Construction Co.**, of Minneapolis, Minn., with bid of $1,234,941.

Drydock in Jacksonville, Fla., will be erected by **Geo. D. Auchter Co.**, local contractor, for $1,300,000. Runways are under construction in Fort Lauderdale, Fla., by **N. H. Latham & E. H. Latham, Jr.**, of West Palm Beach, for $241,607. **C. L. Browning, Jr.**, of San Antonio, was awarded contract to build steel hangars at San Antonio, Tex., for $566,467. Contract for airport grading in Wheeling, W. Va., went to **Keeley Construction Co.**, of Clarksburg, with price of $535,196. Low bidder for contract to build runways at Aberdeen Proving Ground, Maryland, was **C. J. Langenfelder & Sons**, of Rosedale, with bid of $904,267.

HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Alabama: $268,185 to **W. L. Cobb Construction Co.**, of Decatur, Ga.; $285,885 to **R. T. Smith Construction Co.**, of Atlanta, Ga. Florida: $642,667 to **Ebersbach Construction Co.**, of Tampa. South Carolina: $236,094 to **Hubbard Construction Co.**, of Marion. Texas: $369,817 to **E. Lloyd**, of Fort Worth; $973,944 to **Cage Bros. & L. A. Turner**, of Bishop; $209,379 to **W. W. Vann**, of Kerrville. Virginia: $205,820 to **E. C. Bramham Construction Co. & G. H. Lewis & Son**, of Halifax.

Lombardo Bros. Construction Co., of Cleveland, Ohio, received grade crossing elimination contract in Ohio, for $1,344,680. Low bidder for contract for superstructure for Canal St. bridge in Chicago, Ill., was **Mt. Vernon Bridge Co.**, of Mt. Vernon, Ohio, with bid of $847,018. Grade crossing elimination project in Brooklyn, N. Y., is under way by **Tully & DiNapoli, Inc.**, of Long Island City, for $1,400,000.

MARCH, 1942

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

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"Ten Silver Months..."

"EVERY WEAPON *we make today is worth ten that we might produce next year; for this year—1942—is the critical year in the existence of the United States.*"

This grim challenge was thrown at American industry by Donald Nelson in his first speech as chief of the War Production Board. He was speaking to a group of business paper editors, called together to receive at first hand Mr. Nelson's urgent message to the industries they serve.

"We've wasted the golden months", he declared, "the months in which we could have expanded our steel industry, our chemical industry, our copper industry, and all the others, so that we would have plenty of everything. But we still have ten silver months—the months that remain in 1942—and in them we can do things that we never thought possible."

To that objective Mr. Nelson has dedicated his high talents and boundless energy. And to that task he asks American industry to apply the full measure of its resources and skill.

That challenge should be all that it takes to exact from industry the last ounce of its energies. For by now we all can see that in this war the American way of life is at stake. American industry is the essence of the American way of life. Neither can survive without the other. So, even if it had no better reason, industry must go all out to win this war as a measure of self-preservation. Here self-interest and patriotic duty are synonymous. American industry cannot afford to let America lose this war.

The 1942 job is crucial. If it is well done we have a chance to win. If it is badly done we cannot possibly win. There is the measure of the responsibility that now rests upon the shoulders of industrial management.

It is not just Donald Nelson who asks this of industry. He speaks for the millions of fighting men—on land, at sea, in the air—the world over, whose eyes turn so desperately to the workshops of America. There and there alone can they see the hope of victory.

The people of America are not going to let those men down. They demand of industry every effort and every sacrifice that may be necessary to back them up. On that score, American industry stands, of necessity, on trial before our people. It must come through—or else!

* * *

As industry goes all out to meet this demand, its management asks of those who set its tasks and supervise its performance the utmost possible cooperation. It asks of them specifically an understanding of its problems and a chance to work them out without unnecessary interference. It asks for protection against attack from the rear while it concentrates its energies against the common foe. It asks a truce on economic reforms and social experiments that have nothing to do with winning the war and that are bound to arouse misgiving and mistrust amongst the proprietors of industry. Above all, it asks that it be not made a political scapegoat for every deficiency that is sure to develop in the confusion of a war effort.

This does not mean that industry resents honest criticism or constructive direction. Neither does it mean that it is unwilling to do its best unless it can have its own way in all things. The managers of industry are practical men. They know better than anyone else that unprecedented conditions call for new methods, that they must be open-minded to every criticism sincerely directed toward winning the victory. They know that no one can afford to be smug in the face of a national crisis.

There would be no point to my rehearsing here the pros and cons of such criticisms. Time is too short for that. Only in its performance can industry write a convincing answer to its critics. But as a help toward the achievement of that performance, I should like to clear up, if I can, one prolific source of misunderstanding and mistrust.

I refer to the solicitude of industrial managers as to where their companies may find themselves after the war. *This concern for the future sometimes is misinterpreted to mean that management is blind to the urgency of the present. But it does not mean that. It is a perfectly natural anxiety that must be felt by any responsible management operating under the American enterprise system—which is one of the things we are fighting to preserve.*

Under our system, the managers of industry cannot but feel a sense of responsibility to its owners, not merely for current dividends on their investments but also for the conservation of their properties. That means they must feel some concern over what may happen after the war to a business that now must go all out to help win the war. And their concern is but part of a general concern over what may be the effect of the war on the whole American way of life, preservation of which is our reason for being at war.

To give practical effect to that concern under present conditions is one of the problems of management. It is not an insuperable problem. Competent management will be able to surmount it, I am sure. But the right kind of help from those in authority can make the job a lot easier. And let us note in passing that the problem cannot be written off, as some critics of business seem to think, merely by setting off against it the profits that business can make on war contracts. That misses the whole point.

For a business enterprise is not, as many seem to think, just a "profit machine." It is not set up and operated by its owners and managers for the sake of this month's or this year's profits, without regard to any other consideration.

The fact is that any worth-while business must operate as a going concern. It consists not only of stockholders and managers, but also of employees, markets, distributors, and dealers. Mostly, I might say, of markets, distributors, and dealers. They are the "reason for being" of any business, the source of its payrolls and its profits.

No competent management wants to scrap such essential elements of its business just for the sake of war-bred profits, however large they might look . . . at the moment. Most of the original reluctance to get into arms production, for which industry has been criticized, was not due to a "greed for profits", as has been charged. Rather did it arise from management's mistrust of "war profits" that can be made only by sacrificing the essential elements of a healthy business.

* * *

But now industry faces a dire national emergency. The survival of our country and all its institutions—including American business—is at stake. So management must shape its course to meet without stint every need of the war effort. That means it must subordinate to that effort every other concern. To lose the war is to lose all. We must first win the war if we would save anything.

To the men of management that presents a grave responsibility. It is fair to ask whether government can do anything to help them meet it. One simple thing I think government can and should do. It cannot dissolve all the concerns of management, but it can help substantially.

Government should do all it can to help management conserve those assets of business that will contribute to post-war reconstruction, when that can be done without prejudice to getting on with the war.

Let me explain. Broadly speaking, every business comprises three elements. One is its tangible assets—its factories, machinery, equipment, and materials. Another is its productive capacity—its management, organization, trained working force. A third is its intangible assets—the good-will, familiarity, acceptance, and recognition that it enjoys amongst its dealers, customers, and prospective customers.

When the nation goes to war government becomes the one dominant customer of a business. Of these three elements, the first two—plant facilities and organization—become of paramount importance to the job in hand. But so far as the government buyer is concerned, the third drops to minor importance.

But that third element cannot be ignored by the managers responsible for that business. For it will be their mainstay when they must rebuild that business after the war, when government has lost all interest in its existence, except as a source of tax revenue. That is why government can help greatly if now, during the war, it recognizes the legitimate concern of management to conserve those assets that will be essential to survival after the war.

Everyone recognizes the obligation of government to demand that the individual business go all out for war production, to forbid the production of goods not essential to wage war and to commandeer those that are, to require that a business sacrifice its markets and disrupt its distribution organization. No one questions the right of government to restrict arbitrarily the amount of earnings that a business may retain as profit from its war activities. In short, no one questions the right of government to become the dominant partner in any business that may be needed to win the war and, as dominant partner, to put the national need above any conflicting interest of the business.

But, as it does all this, government should remember that the survival of that business is staked on the public's knowledge and use of those discontinued or commandeered products, on the stability of that crippled dealer organization, on the ability of the business to maintain its standing in a market-place from which, temporarily, it may be barred.

And government can help management to deal with the exacting task it now faces, if it will do all it can to avert the needless sacrifice of business interests that do not conflict with war needs, if it will but remember that one of these days, that business again will be on its own, gathering up whatever resources it may have left, recreating its markets, rebuilding its distribution channels, reestablishing itself as a going concern . . . and doing all this in a competitive world without benefit of war orders.

The only foundation upon which any business can hope to rebuild when that day comes is its customers' memory of its name and their understanding of its products. Whatever credit may be coming to it for its war effort will not avail it very much if it permits itself to be forgotten. Its chief assets in that day will be the identity, recognition, and acceptance it still enjoys amongst those to whom it must look for business.

That is why so many business men, already going all out on their war jobs, become apprehensive whenever some word or act of a legislator or government official seems to question the validity of their sales, promotion, and advertising activities during the war. For they know that it is by such measures alone that any management can hope to conserve—while its business goes to war—the values it will need when it returns to civilian service.

That is why I ask government to do all it can to allay such uncertainties, to reassure business of its desire to help conserve those intangible assets that mean so much to business security. For that, I believe, will strengthen the hand of management in a big way as it goes all out on the vital job Donald Nelson has staked out for industry.

* * *

He has told us that if we are to make these ten silver months productive enough to make up for the golden months that are gone, industry must do things it never thought it could do. That is dead right. For America now finds itself in a position it never thought it could be in.

All too slowly, but very surely, it is dawning upon us that this is OUR WAR. Moreover it was our war long before we knew it or did much about it. So our job today is not merely to match the current production of our enemies. That is not enough. We must produce also enough to match the surplus of resources they had built up before we got started. We must produce enough not only for our own needs, but also for all the United Nations.

Moreover we must produce all that we need for *decisive* victory, for anything short of that will mean defeat. If we would save the American way of life, we must destroy once and for all the forces that threaten it. A stalemate would mean but an armed truce and what that might do to the American way of life and to American industry no one dares to guess. Victory must mean *decisive* victory. And this, very definitely is our war.

And just as definitely, this is OUR YEAR. For in this year—1942—we must prevent our enemies from achieving an advantage that might put victory forever beyond our reach—despite all our vast resources. It is an appalling fact that victory may slip beyond our grasp—not in 1943 or in 1944—but during the months just ahead of us.

"Industry's responsibility in all of this is great," says Donald Nelson. "The job will take brains and initiative, but we can do it if we go out with a will."

To Mr. Nelson, that initiative means that industry must lead rather than follow in the march to more intensive use of our machines and our man-power. We dare not wait for new facilities to meet our mounting needs. More and more we must press for more widespread subcontracting and conversion. And he is counting on that initiative, backed by ever more aggressive effort, to avert or to minimize the compulsory measures that now seem imminent.

"We must stop thinking about what we're going to do to the enemy in 1943 and start thinking of what we're going to do to him in March of 1942. We must make today the things we would be making next year . . . if we had the time to spare."

That, says Donald Nelson, is the task of American industry during the next "Ten Silver Months." And to that gigantic task American industry now must bend every ounce of its abundant strength.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This message is appearing in all McGraw-Hill industrial and business publications, reaching over a million readers.

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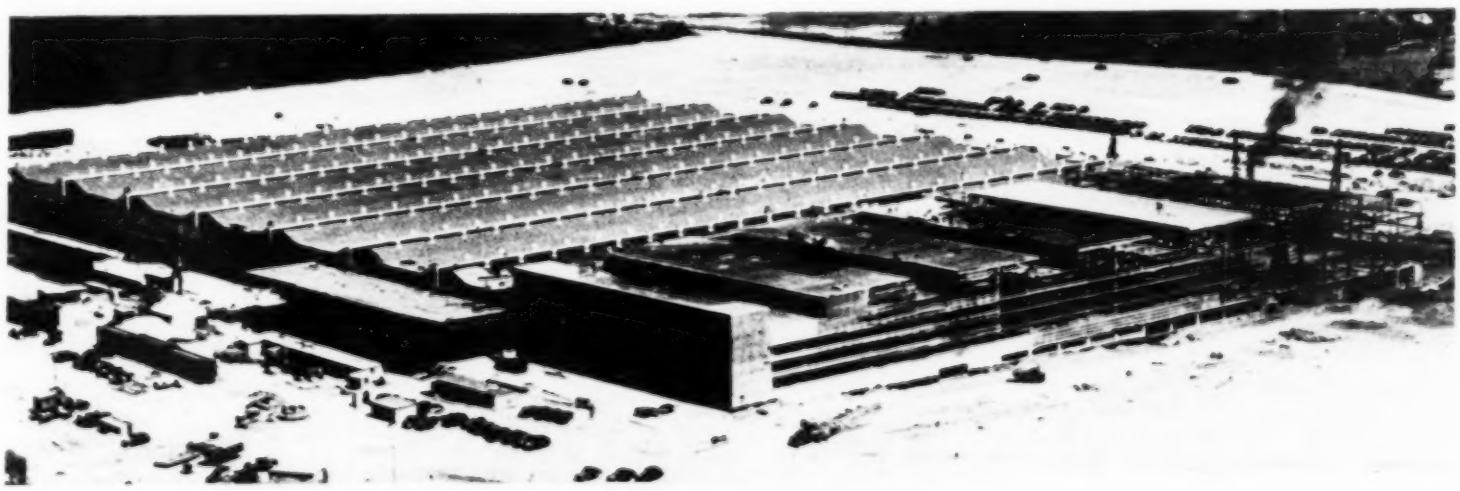
Spring is just ahead . . . warm days turn cold at night. 'Incor's dependable high early strength is a timely safety factor. Use 'Incor'* where it saves time, money, worry . . . elsewhere, use Lone Star Cement. Better cement makes better concrete. Write for copy of "Cold-Weather Concreting." Lone Star Cement Corporation, Room 2263, 342 Madison Avenue, New York. *Reg. U. S. Pat. Off.

Glenn L. Martin Company Plant No. 2, Middle River, Md. Architect and Engineer: Albert Kahn, Inc., Detroit. Contractor: Consolidated Engineering Co., Baltimore.



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★

The efforts of the entire Euclid organization are dedicated to the common cause—utter and complete defeat of the forces bent on abolishing our freedom and our way of life. If we're not able to serve you the way we'd like to until that has been accomplished, we're sure you'll bear with us.

★

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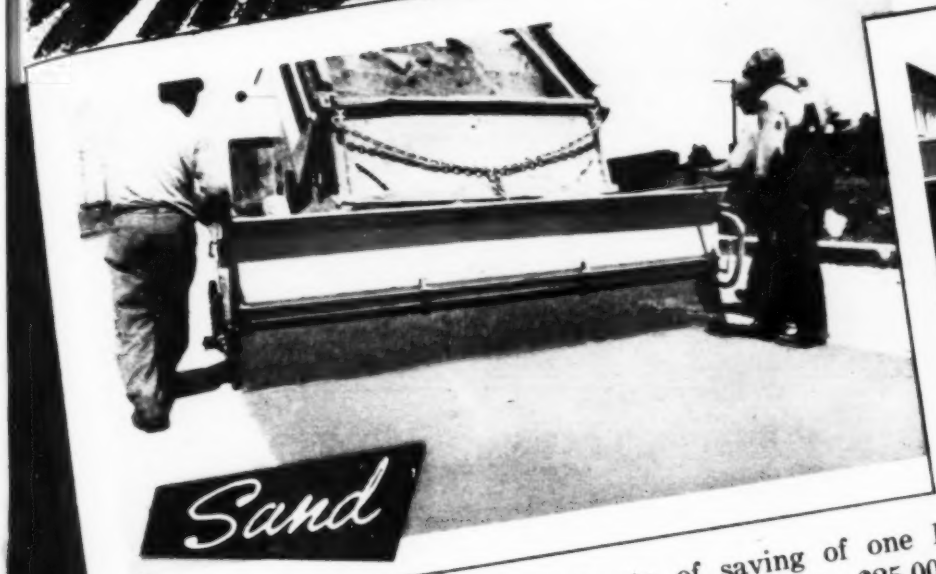

THAT is the conservative estimate of saving of one Buckeye Spreader user. Others have said $1,000.00 a job, $25.00 a mile, 25% over other methods.

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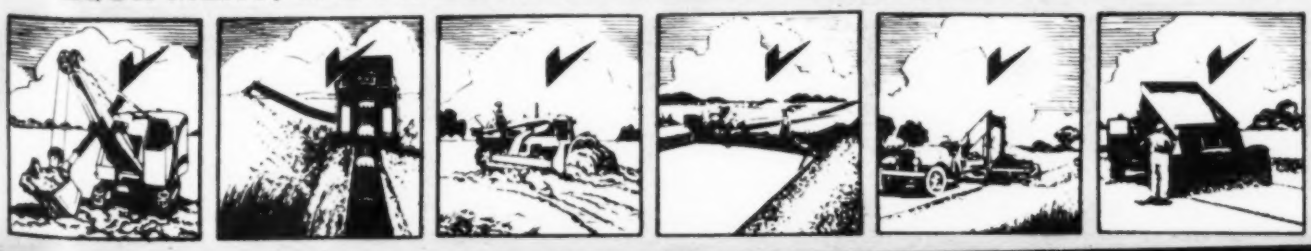

CHECK PAGE 117

CEMENT DISPERSION FOR *Speed* WITH

EVERY industry is calling for more speed with maximum economy. These demands explain the rapidly growing use of Cement Dispersion in important construction projects.

The need for greater cement efficiency has been realized for many years. Now Cement Dispersion gives this higher efficiency long desired. Greater cement efficiency — through Pozzolith, brings greater speed and *initial* savings. (See "How Cement Dispersion Works" — opposite page.)

Cement Dispersion is important to *all* concrete construction, because with Pozzolith speed is assured and *initial* savings available whether the requirements are density, workability, placeability, water-tightness or durability.

Send for Research Paper Number 36, "Economics of Cement Dispersion", and complete information on Pozzolith.

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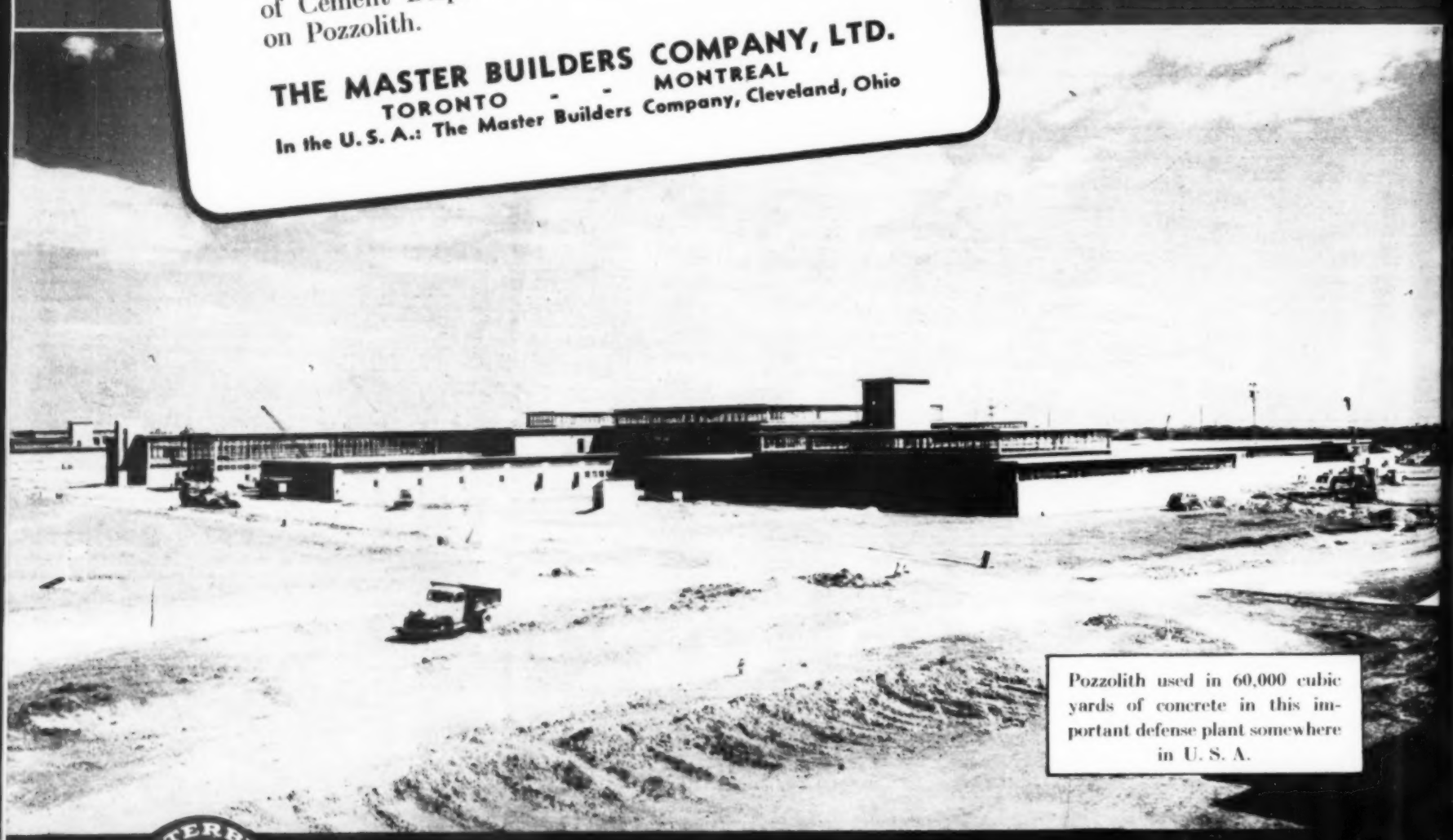
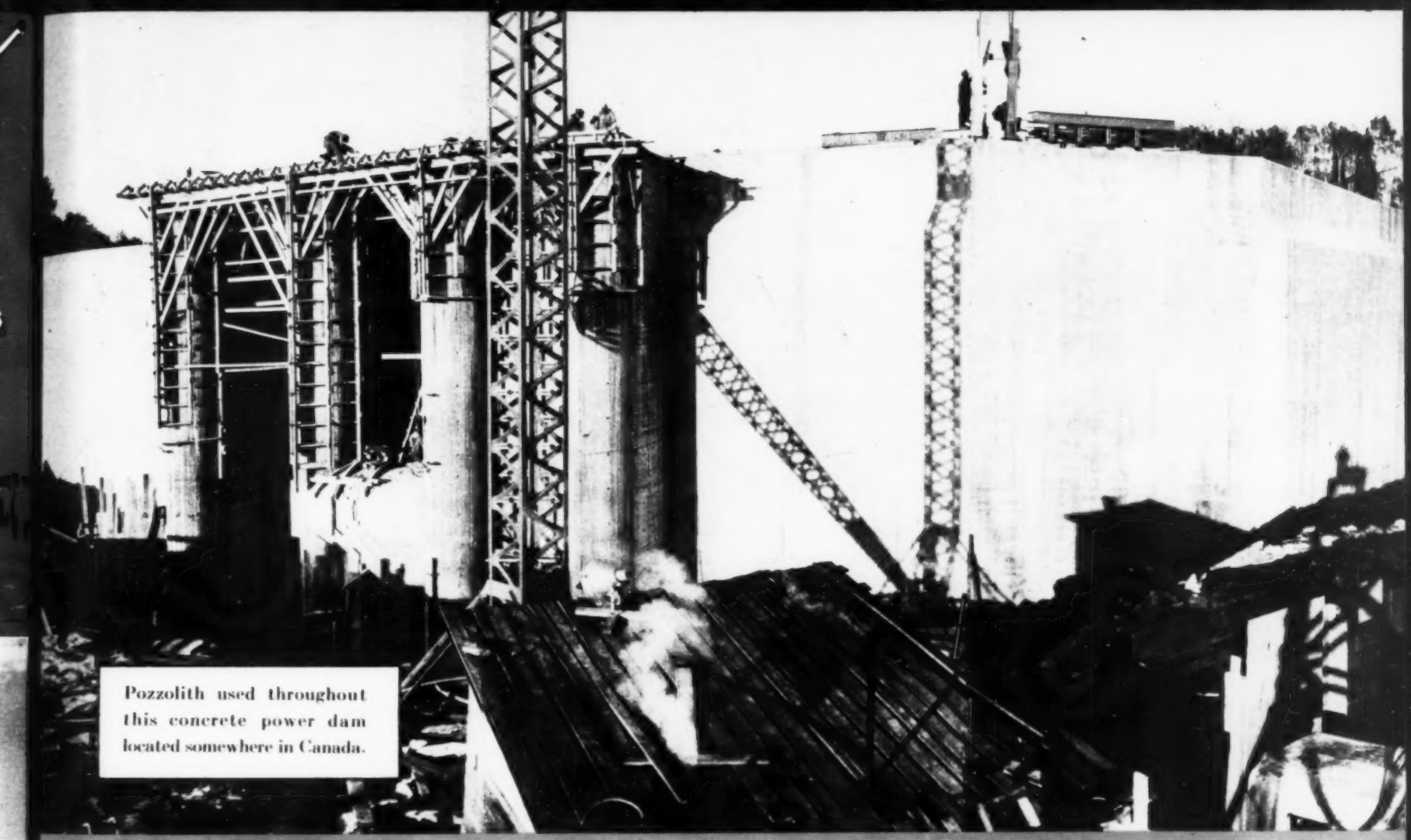


Pozzolith used in 60,000 cubic yards of concrete in this important defense plant somewhere in U. S. A.

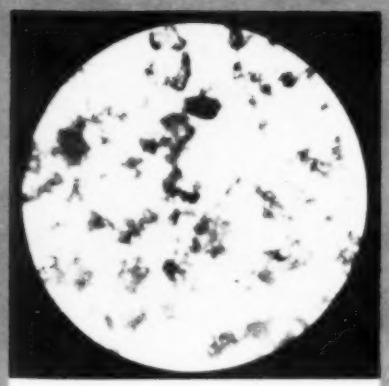
MASTERBUILT PRODUCTS

MASTER B

MAXIMUM *Answers the Call Savings...*



Pozzolith used throughout this concrete power dam located somewhere in Canada.



Cement suspended in water
UNDISPERSED

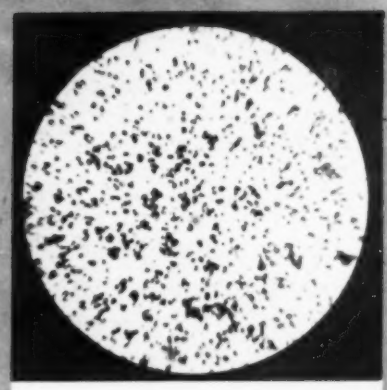
WITHOUT POZZOLITH

In a normal concrete mix, cement particles tend to bunch together, thereby (1) limiting hydration and (2) trapping water within the cement clumps. (See photomicrograph above).

HOW CEMENT DISPERSION WORKS

Only a part of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% hydrates. [Anderegg and Hubbell, A. S. T. M. 29 II 554 (1929)].

Dispersed cement produces 25% to 40% higher compressive strengths.



Cement suspended in water
DISPERSED

WITH POZZOLITH

Cement Dispersion drives these particles apart and (1) exposes their entire surface area to hydration, at the same time (2) making the water entrapped in the clumps available for lubrication of the mix. (See photomicrograph above).

BUILDERS

MASTERBUILT PRODUCTS

Hard-driven Diesels need an oil that won't CRUMPLE

Tight operating schedules . . . machines taxed to the limit . . . can the oil you use stand this punishment? Shell Rudis Oil has already proved its mettle. In the toughest kind of service; under severe temperature and operating conditions, you'll find Shell Rudis Oil:

1—Has high oxidation stability.
2—Keeps rings and pistons free.
3—Is non-corrosive to bearing metals.
4—Reduces lacquer, varnish and sludge formation.
5—Cuts down engine wear.

Why accept less? Call in Shell!

SHELL

— Lubricate your equipment with tough

SHELL RUDIS OIL FOR HEAVY DUTY

(West of the Rockies Order Shell E-980 Oil)

THE DOLLARS YOU INVEST IN P&H

will be worth more tomorrow

All-welded construction of rolled alloy steels means longer years of service, lower maintenance.

True tractor-type crawlers assure long, trouble-free travel.

Low pressure hydraulic control —smoother, easier, more positive.

Selective three-speed transmission for all operation.

Triple-safe, load lowering mechanism.

Triple-safe, planetary boom hoist.

The many modern P&H features will protect you against obsolescence for years to come.

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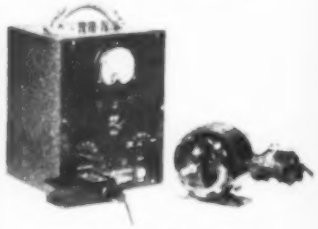
BE A STEP AHEAD WITH P&H

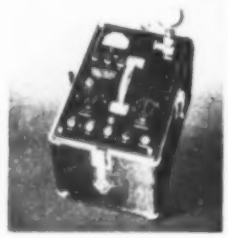
More for your excavator dollar

Among the many instruments needed for indicating, recording, and analyzing vibrations, movements, noises, and accelerations in aircraft, ships, equipment, and structures, the following are worthy of consideration:



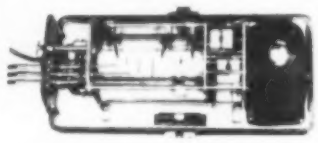
VIBRATION MEASURING EQUIPMENT

Velocity unit, Amplifier-vibration Meter, and Integrating unit for indicating velocities and displacements. In conjunction with recorders, oscillographs, and analyzers, records of amplitudes, velocities, frequencies, and accelerations are obtained.



SOUND LEVEL METER

For the study of noises in engines, propellers, aircraft cabins, buildings, and equipment. Operates with a piezo-electric pick-up to measure vibrations. By amplifying and recording the output of the meter, permanent continuous records of noises and vibrations are obtained.

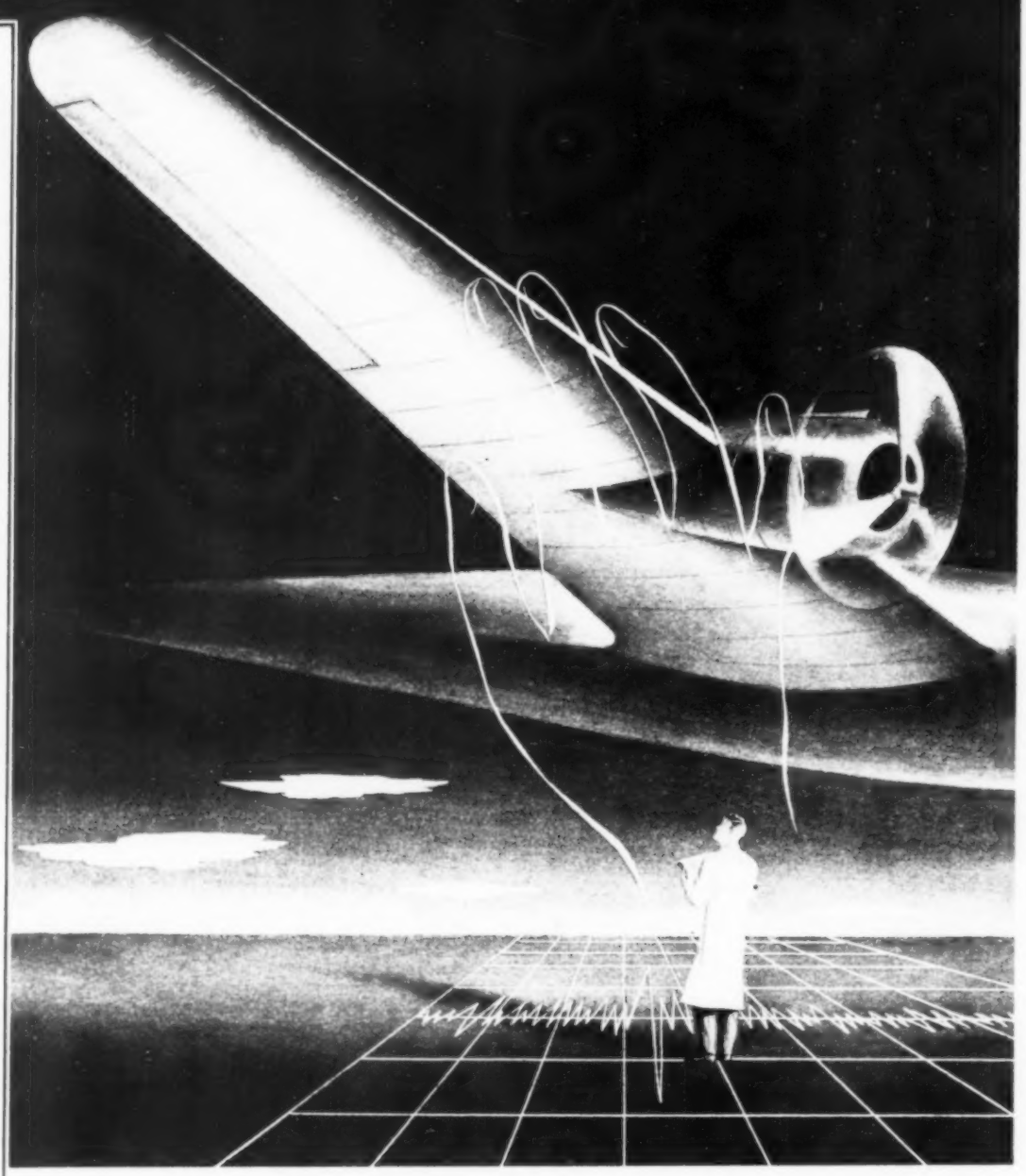


REDHED FLIGHT ANALYZER

A portable instrument for recording the action of airplanes in flight —movements of rudder, ailerons, pitch of plane—especially useful in pilot training. Similar recorders are available for analyzing the actions of railroad cars, autos, boats, and other vehicles.
(Illustrations: General Electric Co.; General Radio Co.; Impact Register Co.)

* * *

Other auxiliary testing equipment in this group: *Waugh Chronograph* for obtaining time-space curves up to 60 inches per second of chart speed. *Bernard Mechanical Oscillators* — apply periodic forces of known magnitudes and frequencies to structures. *Torque Testing Machine* accurately measures torques, in inch pounds, in bolts, shafts, crank shafts, and members of many shapes.



His knowing fingers feel an airplane's pulse

Aviation is one of many industries whose products must be able to "take it." Their performance depends on pre-testing . . . exact knowledge of the effect of strains, forces, and vibrations in and on their structures.

Waugh Laboratories was organized for exactly this purpose.

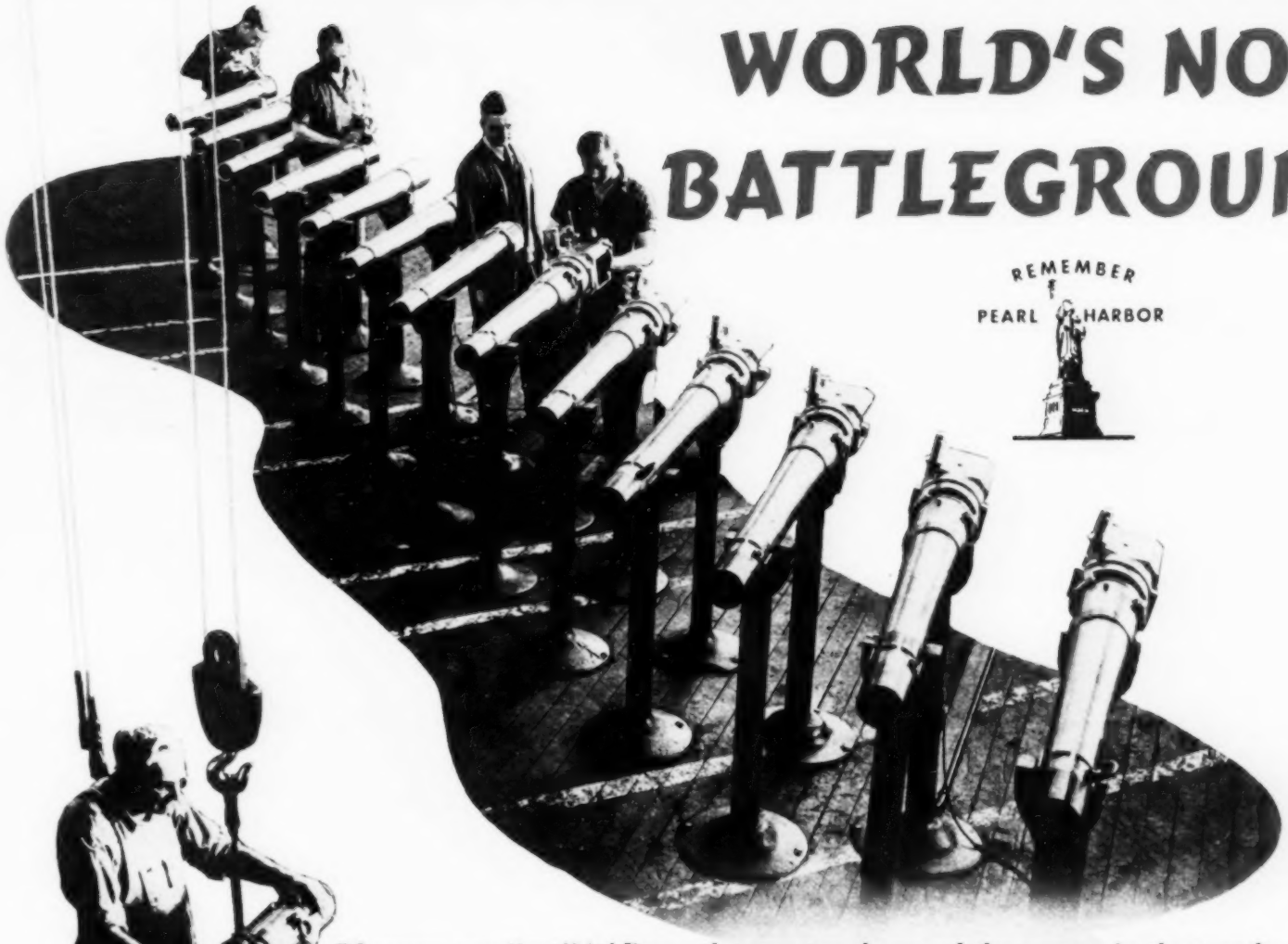
Waugh Engineering Field Service for structural testing in field or laboratory is available with all types of instruments on a *per diem* or contract basis. Instruments may be purchased if desired; many of them may also be rented.

For information regarding Waugh Laboratories' service application to particular industries, write to Nereus H. Roy, Director, at the address below.

WAUGH *Laboratories*

A DIVISION OF WAUGH EQUIPMENT COMPANY • 420 LEXINGTON AVENUE, NEW YORK, N. Y.

WORLD'S NO. 1 BATTLEGROUND!



Of course you "get" it! Down the street and around the corner; in thousands of plants across the land; the battle of production for National Victory is being waged with unparalleled intensity. Right up in these front ranks you will find thousands of builders and contractors contributing the sinews of this battle—steel. Steel, saved by turning away from the "home-made", "make-shift" concrete form-tying devices of wire, band or rod ties, fabricated on the job. Steel saved by turning to Richmond, because—

Richmond Makes 1 Ton of Steel Do the Work of 3 Tons

—and because it's so widely accepted, now, that the "Richmond Way" is the profit-making way in concrete form work of any sort. Profit-making *because* the superior engineering of Richmond's line, of more than 85 especially developed products, makes the job go better and faster. Profit-making *because* long hours of figuring and all guess work are eliminated by Richmond's free technical and estimating service, which gives your men on the job a printed "map" of the job, complete with ty-spacing data. Profit-making *because* Richmond's working parts such as Tylags, Tycones, Flat Washers, Tywrenches, etc., don't tie up your money. You don't buy these. We loan them! Far more, all this, than a line of products. Here is service with a capital S. Here is method, engineering, cooperation such as you will find nowhere else. And, it makes you money at the same time that it gains you recognition as aiding National Victory. Prove it? Naturally!

We Sell All Types...We Recommend Only Prefabricated Ties...They Cost Less!

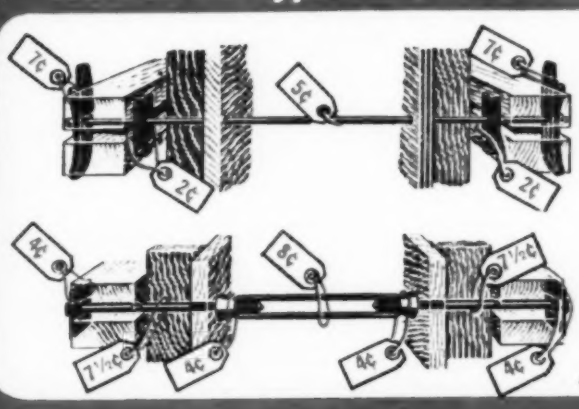
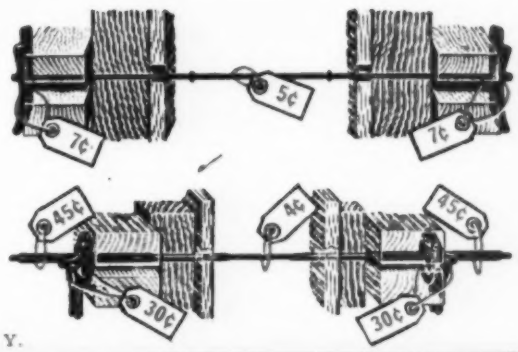


Figure it for yourself!
HERE ARE THE PRICES*



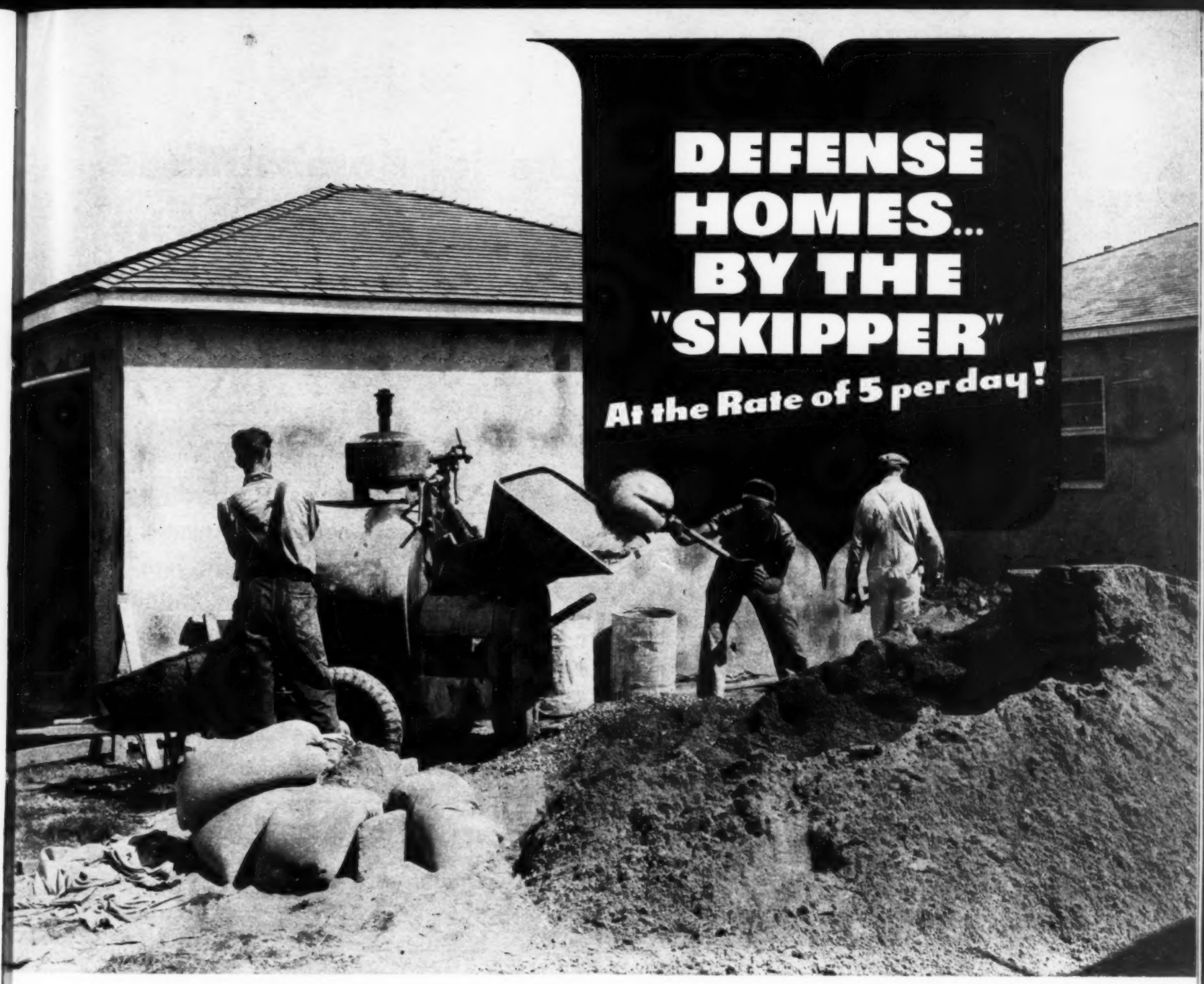
*BASED ON A 12' CONCRETE WALL

ALL PRICES F.O.B. BROOKLYN, N. Y.

RICHMOND SCREW ANCHOR CO., INC.

816-838 LIBERTY AVENUE • BROOKLYN, N. Y.

TIME AND LABOR SAVING CONSTRUCTION DEVICES FOR CONCRETE CONSTRUCTION



★ ★ ★ ★ ★ ★

Can a small mixer be of help on a big job? The Rex Skipper—the new 3½S half-bagger—is saying "yes" to this question on job after job these days—as it is. Here, for instance, on this 150-home project, in an eight-hour day, the Skipper is mixing enough concrete for five *homes —even though each home requires an entirely new mixing set-up.*

THERE are good reasons why the Rex Skipper can outperform all other 3½S drum mixers in the field.

First and foremost: *we built it that way!* We built it with the Rex Hi-Lo Skip Hopper, which is a fancy name for one of the most simple, fundamental advantages found on any half-bag mixer on the market. The Rex Skip Hopper moves *up* for dumping material into the drum, swings *down* to a 6-inch lower shoveling height than any other—saving up to 15 feet of shoveling height with every batch—stepping up production as much as 30%. And it's self-cleaning, with no hopper gate to worry about!

Small in size, big in capacity, the Skipper competes on a par with many 5S mixers.

Ask your Rex distributor about it or send for the book, "The Greatest Mixers Rex Has Ever Built." Address, 1664 W. Bruce Street, Milwaukee, Wisconsin.

REX **MIXERS**

3½ CU. YD. TO 28 CU. YD.—ALL TYPES

CHAIN BELT COMPANY OF MILWAUKEE

Aerial Bombs Made from Steel Saved by Preformed Wire Rope

★ By lasting longer, preformed wire rope conserves steel which America greatly needs. For example, it conserved enough steel last year through longer service to make more than 73,000 aerial bombs for our armed forces.

★ Back of the armed forces—in the industries that provide their requirements—preformed wire rope plays an important part by reducing the frequency of machine shutdowns. This wire rope lasts longer, it steadies production, and is easier and safer to handle. It saves both time and money.

★ Preformed wire rope is an essential to American industry—a necessity for the Nation.

PREFORMED WIRE ROPE

Ask Your Own Wire Rope Manufacturer or Supplier

★ WE'LL MOVE THE EARTH TO SERVE YOU! ★

★ IF IT CAN BE DONE A PARSONS WILL DO IT FASTER! ★

PARSONS TRENCHERS

Are doing their full share of vital Defense Work on Ordnance Plants, Air Ports, Army and Navy Bases, Camps and Housing Projects.

TIME is money these days—every hour saved getting a Defense project into operation increases our National Safety. The modern design and heavy duty construction of Parsons Trenchers has enabled many jobs to be completed ahead of schedule.

SPEED under most adverse conditions must be maintained to meet today's production schedules. Parsons Trenchers built with alloy steels, anti-friction bearings, offset boom, low ground pressure, power shift conveyor insures maximum digging speed with minimum delays and operating costs.

Investigate PARSONS' superiority before you buy. Consult your nearest distributor, or write:

THE PARSONS COMPANY
NEWTON, IOWA

To meet the present emergency

STANDARD OIL OFFERS

FLEET CONSERVATION SERVICE

To make trucks and parts last longer

Why not let a Standard Automotive Engineer answer your questions about this Fleet Conservation Service?

FOR SALESMEN'S CARS

If your fleet includes salesmen's cars or delivery units, that cannot be serviced at your own garage, urge your drivers to use the *Car Conservation Service* offered by Standard Oil dealers. Watch how this service at regular intervals cuts down maintenance and replacements.

● There may be some uncertainty about getting new trucks when they are needed, but there's no doubt about the safest policy to follow until you find out. Start getting every possible mile of life from the equipment you have—down to the smallest motor part.

What can you do that you aren't already doing in your regular maintenance program? Why not let a Standard Automotive Engineer help you answer that question?

These Engineers are trained and equipped to help you find hidden waste in fleet equipment. With their instruments for analyzing fleet engines, they can help you uncover the weak spots where trouble is likely to occur. They can help your shop men carry on a real "preventive maintenance" program. This service, plus the use of high quality products they recommend, may bring many unexpected savings.

Find out what a Standard Automotive Engineer does and how he might help you make your much needed equipment last longer. Just write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois. In Nebraska, write Standard Oil Company of Nebraska at Omaha.

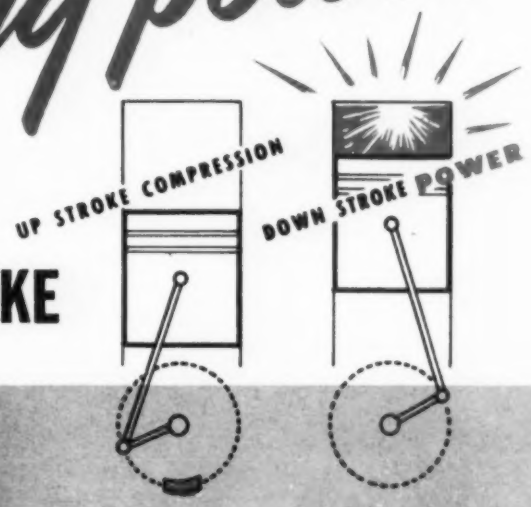
STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE LOWERS MILEAGE COSTS

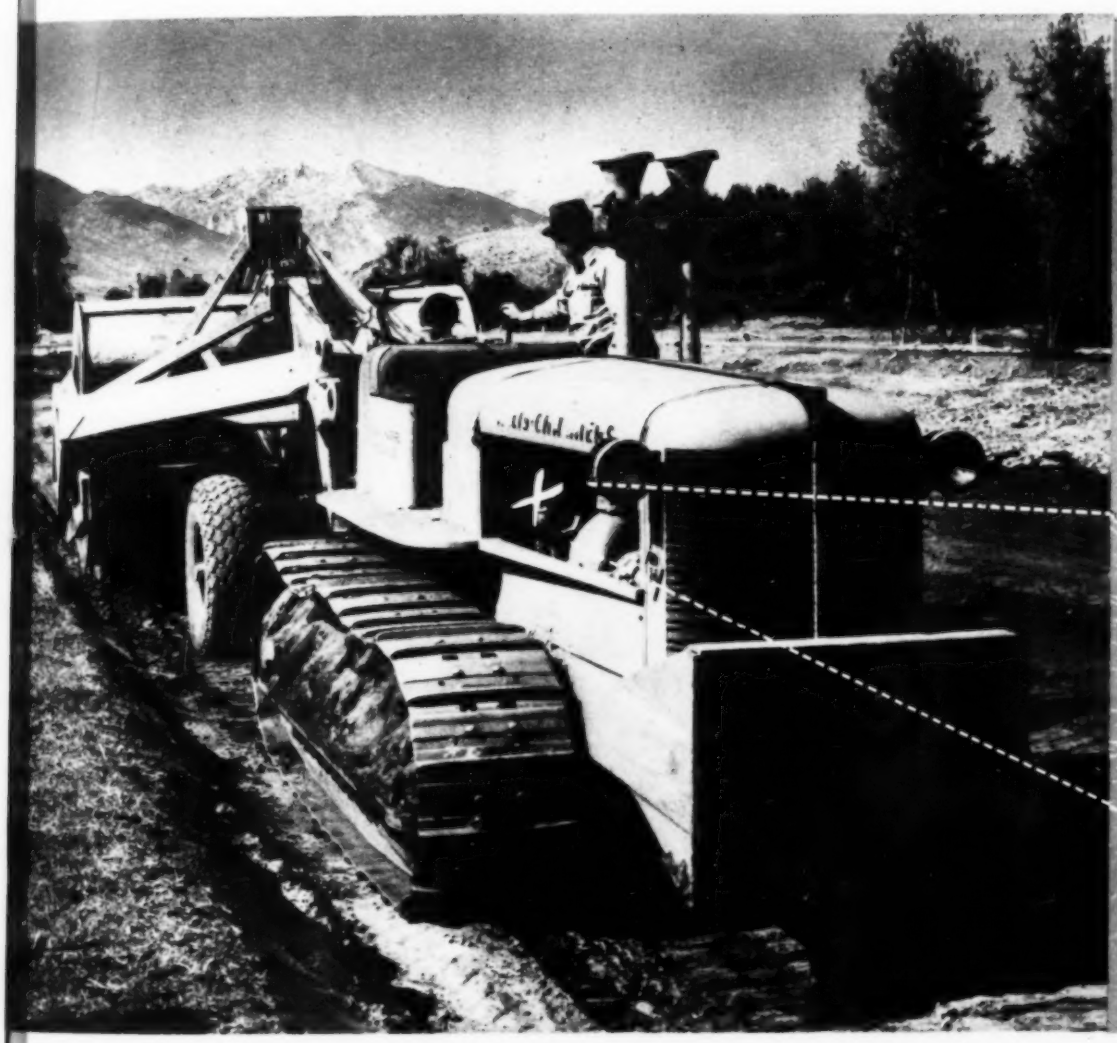
2-CYCLE DIESEL

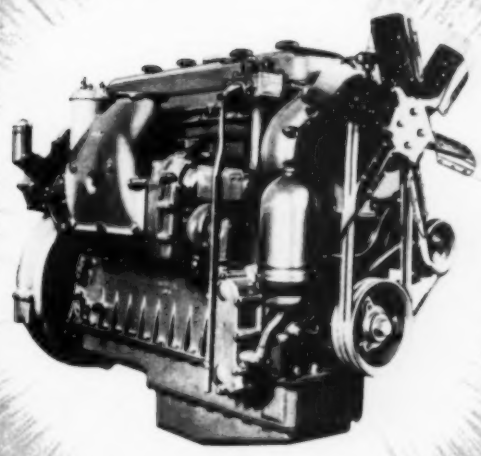
It's Double-hitting power

.. POWER IN EVERY DOWN STROKE



You eliminate exhaust and intake strokes on a 2-cycle Diesel. Fresh air is forced in by a blower and exhaust gases expelled while piston is at the bottom of the stroke. Every up stroke is a compression stroke . . . every down stroke a power stroke.



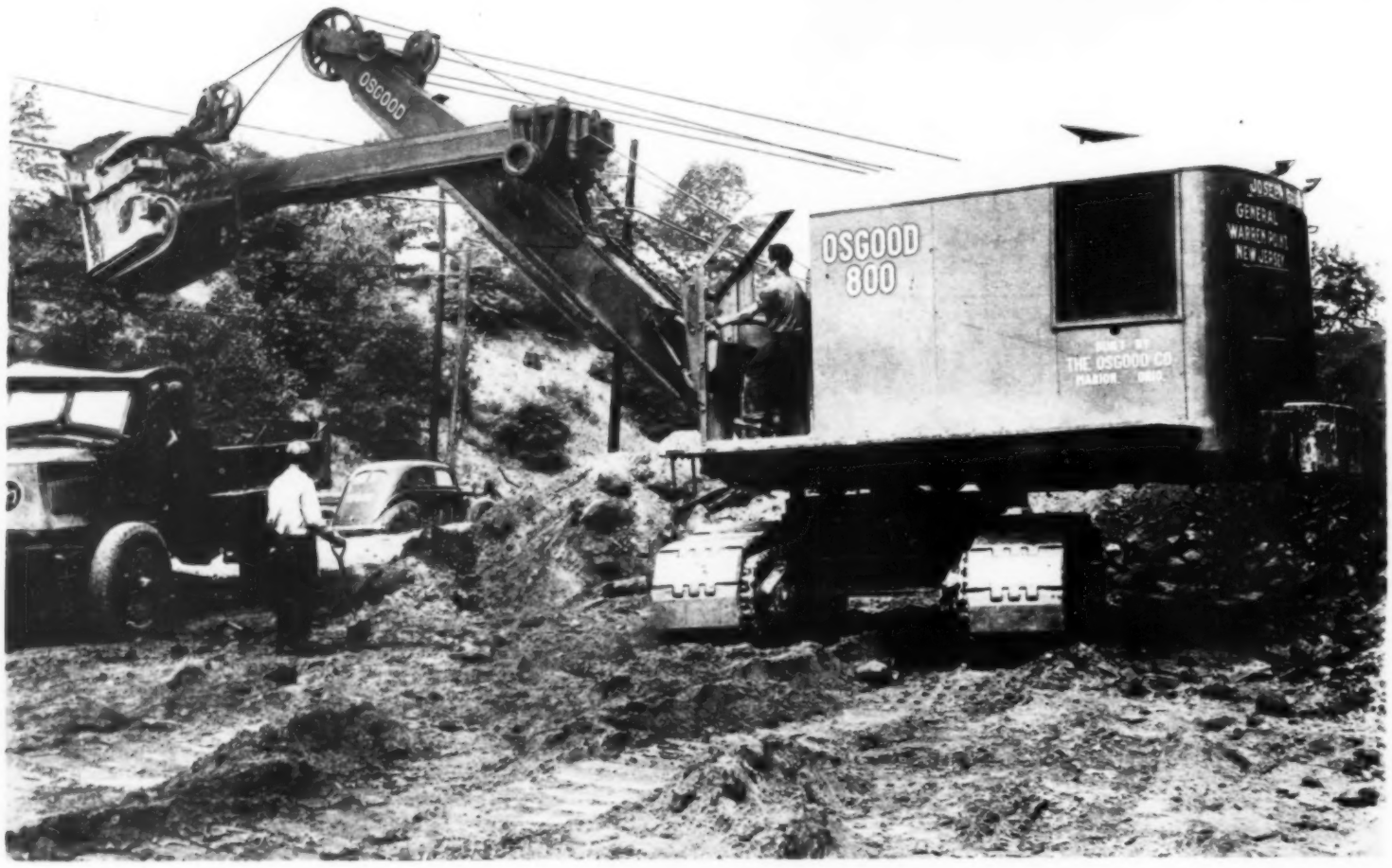


No wonder the 2-cycle Diesel has so much zip and power and smoothness . . . no wonder it's the modern Diesel power! It develops twice as much power as a 4-cycle Diesel with an equal number of cylinders, and the same bore and stroke, operating at the same crankshaft speed. Thus, a 3-cylinder engine is the equivalent of a 6 . . . a 6, the equivalent of a 12! The result is smoother operation and far greater hanging-on ability—the outfit keeps moving when the going gets tough. There's less gear shifting, too! You can throttle down to half the rated engine speed and still maintain your lugging power . . . also, pick up top traveling speed in a hurry. There's less upkeep, too! Two-cycle smoothness is easier on engine parts, and easy on the equipment. Half the number of cylinders means half the maintenance . . . greater simplicity! Get all the facts on this modern Diesel power. Write for catalogs on 2-cycle Diesel tractors and the Model AD Motor Grader.

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

3 SIZES . . . HD-7, HD-10, HD-14
60 TO 132 DRAWBAR HORSEPOWER

2-Cycle
THE MODERN DIESEL POWER



OSGOOD

Type 80, Model 800 Air-Control Shovel owned by Joseph Grisafe of Warren Point, N. J. Air-Control is equally effective on shovel, dragline or crane work.

AIR CONTROL SMOOTH AS STEAM?

Well, old time operators—who ought to know—say it is. Just as easy to handle—and quite as important—it's just as dependable.

Write for our new illustrated Air-Control Catalog

The GENERAL EXCAVATOR CO.
Sizes: ¾-1½-5-7
DIESEL - GAS - ELECTRIC
Associated with THE OSGOOD CO.

The HERCULES COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with THE OSGOOD CO.

OSGOOD

Sizes:
½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric

OSGOOD MARION OHIO U.S.A. GENERAL HERCULES

SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE OSGOOD COMPANY, Marion, Ohio

...Even Sticky Gumbo

● YOU can load mud as sticky as this with a CW-10 "Carrymor" Scraper and do it at a profit. At this job on a Kansas airport there was no time to wait for weather and good conditions. *Construction had to move ahead at top speed.*

And construction *can* move ahead of schedule with these high speed, long haul scrapers. They load easier because the bowl bottom and cutting edge are curved, the pushout gate is curved and slopes back and the entire weight of the scraper . . . and the load as it increases . . . may be placed on the cutting edge thanks to uniform weight distribution. Also, hydraulic power makes adjusting the depth of cut so easy and accurate that loading is fast. The same hydraulic system provides such power that unloading, even in gumbo, is quick and complete.

For profitable, high speed, long haul earth-moving, use CW-10 "Carrimor" Scrapers on your job!

LaPLANT-CHOATE

Factory & Home Office
Cedar Rapids, Iowa

Manufacturing Co. INC.

Pacific Coast Office
San Leandro, Cal.

EARTH MOVING - LAND CLEARING - SNOW REMOVAL EQUIPMENT

SKILSAW TOOLS

MODEL "77"
CUTS 2¼ IN. DEEP

MODEL "80"
½ IN. SKILDRILL
CAPACITY IN STEEL ½ IN

IN WOOD 1¼"

MODEL "83"
½ IN. HEAVY DUTY
CAPACITY IN STEEL ½ IN

IN WOOD 1¼"

MODEL "123"
¼ IN. HEAVY DUTY
CAPACITY IN STEEL ¼ IN

2 3/8"

IN WOOD 1 3/4"

SPEED UP WAR CONSTRUCTION!

Plants that are needed *fast* are being built *faster* with these SKILSAW TOOLS! Here are the saws and drills that play so big a part in the greatest construction program the world has ever seen—helping build cantonments, war-material factories, defense housing projects—making each hand do the work of many—stretching each hour over more work done!

SKILSAWS will speed *all* your sawing on *every* size of lumber you use—9 powerful models. SKILSAW DRILLS will give you *more holes per hour* in lumber and steel—23 models. Ask for a demonstration and you'll see why *9 out of every 10 defense contractors* use SKILSAW TOOLS!

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New York • Boston • Buffalo • Philadelphia • Cleveland • Detroit
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These Skilsaw Tools save Days and Dollars For Victory!

"CATERPILLAR" Diesel Tractors, Engines and Motor Graders aren't looking for soft jobs or push-overs. They'll take on all comers — stand toe to toe and slug it out to a finish.

Rugged strength and stamina are built into every "Caterpillar" Diesel product from the ground up. Those qualities, along with sound engineering design and outstanding economy, have enabled "Caterpillar" Diesel equipment to lick the toughest defense construction jobs in the country.

One example of built-in "Caterpillar" quality is the "Hi-Electro" hardening that gives cylinder liners and crankshafts *more wear-resistance* than can be had by any other practical heat-treatment method. In the famous "Caterpillar" Diesel track-type Tractors, "Hi-Electro" hardening adds longer life to track roller-rims and shafts, track pins and other important parts.

The "Caterpillar" Diesel DW-10 Wheel Tractor, husky newcomer in the line, has the same dependable engine, the same strength and simplicity of design. It adds the speed for long, fast, heavy hauls.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

• • •

***FOR VICTORY**—Our armed forces have first call on "Caterpillar" production. We thank customers who have suffered delivery delays by giving clear right-of-way to our Victory efforts.*

TO TAKE IT

Where the going is rough and tough, "Caterpillar" Diesel Tractors prove their ability to take it. This "Caterpillar" Diesel D8 is bulldozing rock in Jacumba Pass, California.

The "Caterpillar" Diesel DW-10 Tractor can start and fill an 8-yard scraper or walk off with a big payload at 18 miles per hour. "High-traction" differential. High clearance. Heavy-duty constant mesh transmission. Five speeds forward. Scientific weight distribution that gives super-traction for every use.

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL

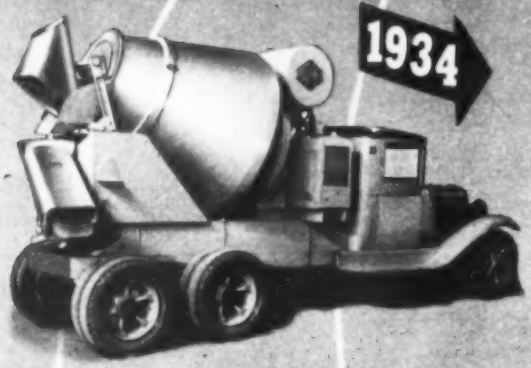
TRACK-TYPE TRACTORS • WHEEL TRACTORS
ENGINES AND ELECTRIC SETS • ROAD MACHINERY

The March of TRUCKMIXER PROGRESS

1930

The old style hatch-loading type Smith Truck Mixer, an excellent machine in its day.

1934



One of the early Smith-Mobile high discharge models, successor to the old-style "hatch-loaders"

1938

Smith-Mobile improved, high discharge truck-mixer — thoroughly tried and field tested.

1942

The new, compact, streamlined Smith-Mobile. Lighter in weight, yet permitting bigger pay loads. The "last word" in truck-mixer design.

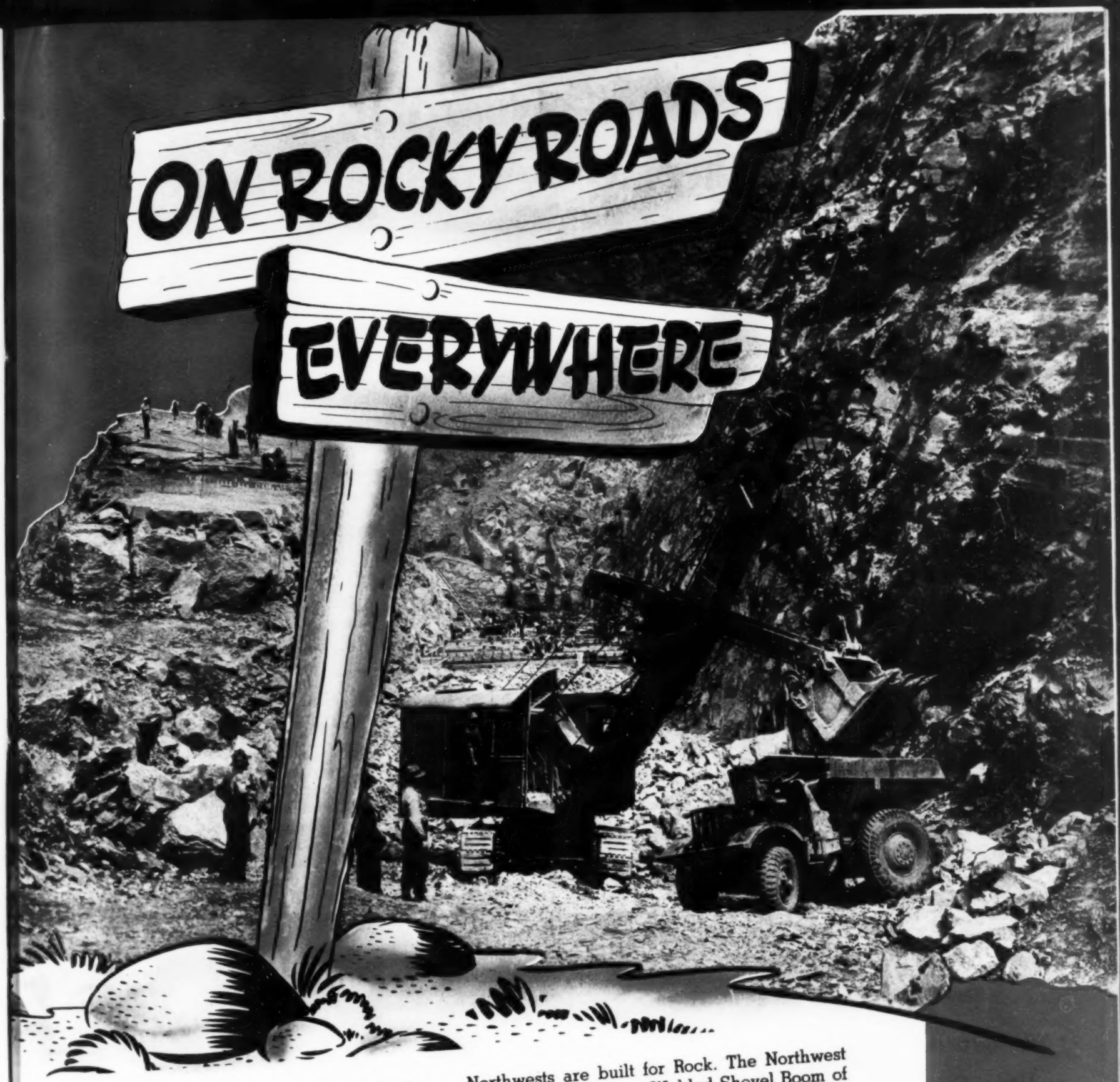
● The evolution of the modern truck-mixer coincides with the history of the new Smith-Mobile. After producing old-style, hatch-loading type machines for several years, Smith Engineers saw the need for eliminating leaky and tiresome loading hatches, troublesome rear discharge doors, clogging water bells and inefficient low discharge. Many years of intensive research and field tests followed. Then came the announcement of the new Smith-Mobile — —the industry's first HIGH DISCHARGE truck mixer. And with each succeeding model, important refinements were added.

Today, in its 5th year of quantity production, Smith-Mobile is the acknowledged leader in the industry. Sales have increased by leaps and bounds. Ready-mixed operators, contractors and engineers everywhere are acclaiming this new machine for its greater speed and efficiency. They like the HIGH DISCHARGE without hoist . . . the CONTROLLED DISCHARGE without segregation . . . the VISIBLE MIXING feature...the successful REAR END CHARGING . . . the new way of introducing water through the feed opening. *No other truck mixer can give you these features.* So play safe! Buy time-tested Smith-Mobiles. Write for new Catalog 198-B.

The T. L. SMITH COMPANY

2851 N. 32nd St. Milwaukee, Wis.

SMITH-MOBILE *The Original High-Discharge* **TRUCK MIXER & AGITATOR**



No matter what kind of digging you're in — Northwest Rock shovels make the job easier. Being able to slug right in with the Dual Independent Crowd that utilizes force other shovels waste — being able to get a full dipper practically every cut without any "second starts" — making a fast, easy swing, an accurate "spot" at the truck and back again, knocks the seconds off and gets the yardage out in the toughest going.

Northwests are built for Rock. The Northwest Shovel Boom (and no Welded Shovel Boom of Northwest design and construction has ever failed), takes the shocks of rock digging. The "feather-touch" Clutch Control makes handling easy and relieves "day end" fatigue. These are exclusive Northwest features that help to speed any kind of digging.

NORTHWEST ENGINEERING COMPANY
1728 Steger Building, 28 East Jackson Boulevard, Chicago, Illinois

—And if you have a real Rock Shovel, you'll never have to worry about output in dirt!

NORTHWEST

3 ways to make your Wire Rope dollar go farther...conserve steel tonnage too

(No. 9 in a series of informative articles for wire rope users prepared by the Macwhyte Wire Rope Company. Previous articles in this series are available on request on your company letterhead.)

1 Buy PREformed; it's best, costs less

There have always been sound reasons for buying PREformed wire rope. Careful tests time and again have proved it gives better service than non-preformed, costs less in the long run, saves time because fewer shutdowns are necessary for replacements.

Fig. A — PREformed ropes are free of internal stress, have high fatigue resistance.

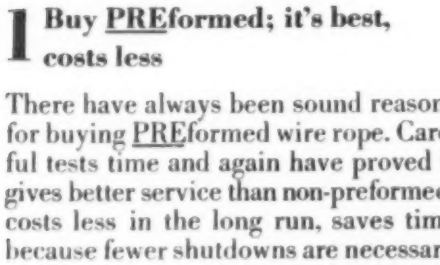
Today there's another reason why it's most important to buy PREformed: by doing so you help national defense.

It takes just as long at the steel mill to make steel for non-preformed as for PREformed wire rope. Yet PREformed will outlast ordinary wire rope on most jobs. When you buy Macwhyte PREformed, therefore, you're helping conserve not only steel which America greatly needs, but also the time of those who make it.

2 Install Rope Carefully

It's so easy to kink or twist rope when installing in a hurry. Such "haste makes waste." Kinking and twisting definitely shortens rope life.

With reasonable care and speed you can prevent both. Here are some simple suggestions on unreeling and uncoiling rope . . . operations where both kinking and twisting are apt to occur.



CORRECT WAY

Unreeling—The reel should be revolved and the rope taken off the way it is put on the reel. Illustration No. 1 shows one method—put a shaft through the center of the reel and jack it up so that the reel will revolve freely. Pull the rope straight ahead, keeping it taut to prevent it from loosening up on the reel. A board held against one flange may be used as a brake to keep the reel from revolving too fast.

Uncoiling—Roll the coil along the ground so the rope lies straight as shown in Illustration No. 2. There will be no twist or kink in the rope if these instructions are followed.

INCORRECT WAY

Illustrations 3 and 4 show incorrect ways of unreeling and uncoiling. Notice that the reel and coil cannot revolve and therefore the rope is twisted as each turn is taken off.

3 Inspect Your Ropes Regularly

Once wire rope is on their equipment many users overlook the value of regular inspection. Such negligence is costly. It can be avoided by regular inspection which takes far less time, is much less expensive than too frequent buying and replacing for lack of knowledge of their condition.

Pictured here are a few of the most common "Wire rope enemies" which, if *not* eliminated or kept under control, can easily reduce the service life of your rope as much as 50%. Also given here are suggested methods of avoiding these dangers.

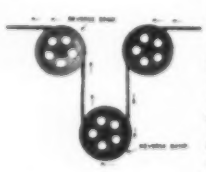


Fig. B—Reverse bends—Years of experience and many tests have proved that reverse bending and excessive wire fatigue reduce rope life as much as 50%.

Where reverse bending cannot be eliminated, use the largest sheaves possible and place them as far apart as possible. By getting the MAXIMUM distance between reverse bends, you reduce fatigue—provide longer service.

Fig. C—Sheaves too small. This rope was forced to travel continuously over sheaves whose diameters were too small. Frequent inspection would have shown this danger. A change to a larger sheave would have solved the problem. (Note: PREformed wire rope would have lasted much longer in this case.)

Fig. D—Drum abrasion and abuse caused this. The rope was scuffed over and over against previous wraps on a flat-faced drum. This could have been prevented by even winding and grooved drums.

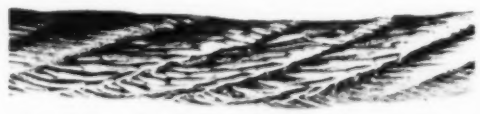


Fig. E—Kinking caused this. This dog-leg, or kink, was finally straightened out . . . but notice the uneven wear at the point where the kink had been. Proper handling during installation could have prevented this. Beware of dog-legs! They're expensive.

Why Guess? When you can KNOW!

Macwhyte Company wants you to know that they will be glad to offer recommendations of the correct ropes for your equipment and, if you like, discuss with you possibilities of getting more from the ropes you are using . . . should there be any doubt in your mind as to whether you are getting the best service.

FAST LOADING

At a Florida airbase, this Model W4 MobiLoader steps up production in sandy soil on an excavating job. This model has a bucket capacity of 1⅛ cubic yards. The MobiLoader is also built to fit the "Caterpillar" D8 Tractor with bucket capacities ranging from 2.7 to 4.5 cu. yds.

HOW ATHEY MOBILOADER SAVES TIME ON URGENT DIGGING AND LOADING JOBS

Here's "double-quick-time" for the construction army that's building the scores of vital victory projects now going at top speed.

In minutes, the Athey MobiLoader does what used to take hours. It's compact and swift-footed for fast action and high output. And it's speeding up digging and loading operations in all types of materials.

Simple in design and simple to operate, the MobiLoader uses the overhead method of discharging its load. It digs at the front, backs up to the fill, or waiting truck, and dumps the material overhead at the rear. You can see how valuable minutes are saved by the MobiLoader method — minutes which today are priceless.

With its weight distributed evenly over the entire track area, the MobiLoader has ample crowding action for tough digging, thus being a practical unit for work in closely-packed materials.

Contractors praise the compactness of the MobiLoader and its ease of moving about in cramped quarters, for it can freely perform in places inaccessible to large, bulky equipment.

Write us today for a free copy of the new pictorial booklet on the Athey MobiLoader, or see your Athey-"Caterpillar" Dealer. Athey Truss Wheel Co., 5631 W. 65th Stret, Chicago, Illinois.

Notice Contractors and Engineers: — Use your Athey-"Caterpillar" Dealer for your equipment-service headquarters. He has full facilities to give you fast, intelligent and low-cost repair service to keep your equipment on the job.

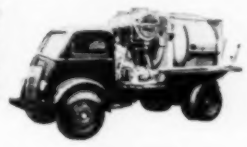
ATHEY

LOADERS . . FORGED-TRAK TRAILERS AND WAGONS

"HIGH DUMP" TRUCK MIXERS
Solve Your Placing Problems

INTO HOPPERS — OVER DIRT PILES INTO THE FORMS

FASTEST LOADING, FASTEST MIXING AND FASTEST HIGH DISCHARGING TRUCK MIXER ON THE MARKET . . .



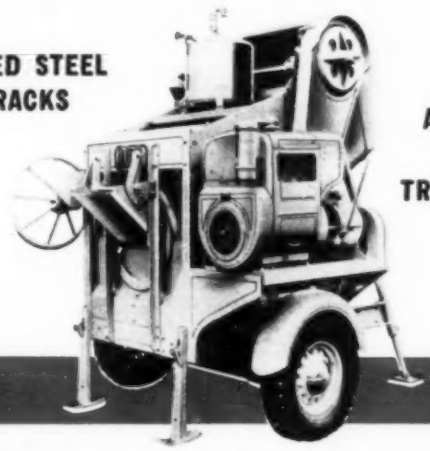
Standard "LOW CHARGE" Models in 2 to 8 Cu. Yd. Sizes.

Jaeger Portable Hoppers Save Waiting on Job!

Let us show you how these mobile, flexible mixing plants, with their faster "One-Shot" Top Loading, 2-Speed Mixing and Vacuum Controlled Discharge can increase your yardage, cut your placing costs. Out-sell all others. Built in 2, 3, 4, 5 yd. sizes — also Combination Top or End Loaders, if desired.

THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio

MACHINED STEEL DRUM TRACKS



AUTOMOTIVE TYPE TRANSMISSION

Built to MIX FASTER
RUN SMOOTHER, QUIETER, LONGER

3½S with Measuring Batch Hopper

14S, 90" Skip

Put a Jaeger on the job and get those profits slower mixers can't produce. Load faster with Automatic Skip Shaker, mix more thoroly with Criss-Cross Action, discharge faster than any other mixer on market. Drums roll on machined tracks, chilled ball bearing rollers. Transmission runs in oil. All sizes trail easily on Timken bearings and pneumatic tires.

Send for Catalog. Compare Prices

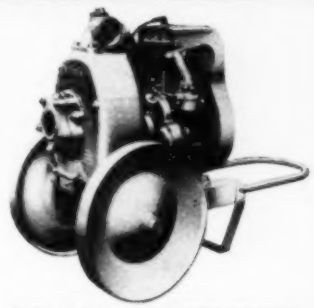
THE JAEGER MACHINE CO.
800 Dublin Avenue, Columbus, Ohio
World's Biggest Manufacturer of Concrete Mixers. All Types, Sizes to 56S.

JAEGER SPEEDLINE

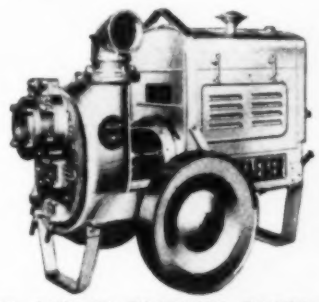
In PUMPS, the BEST COSTS YOU the LEAST

CERTIFIED HIGH PERFORMANCE
Every Jaeger Pump is Individually Tested and Guaranteed for Vacuum, Capacity and Pressure

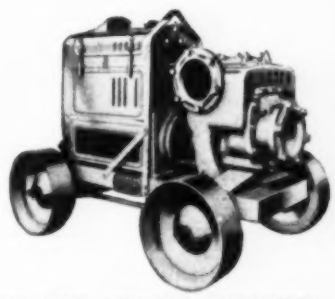
THOUSANDS of EXTRA HOURS of SERVICE
for Your Future Protection as Well as Profit



2" AND 3" HEAVY DUTY PUMPS: Finest engineered small pumps — stand high pressures, continuous heavy service.



4" AND 6" PORTABLE PUMPS: Big capacity (up to 90,000 G.P.H.) and years of service in compact, easy handling units.

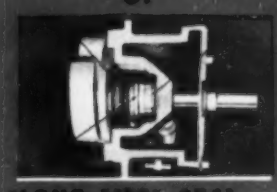


8" AND 10" BIG CAPACITY PUMPS: Huge air and water capacity (125,000 to over 200,000 G.P.H.), plus unequalled compactness and portability.

7 Reasons Why Jaegers Outlast and Outperform Other Pumps:

1. HIGH PRESSURE SHELL, of pat'd self-cleaning design.
2. REPLACEABLE LINERS.
3. PAT'D PRIMING JET, gives up to 5 times faster sure-priming.

4. HI-HEAD, HI-CAPACITY IMPELLERS (of steel in 4" to 8" sizes).
5. OVER-SIZE SHAFTS of heat-treated chrome nickel.
6.



"LONG-LIFE" SEAL — accessible for inspection.
7. DIRECT DRIVE, ALWAYS IN ALIGNMENT — adds life to pump and engine.

JAEGER
"SURE-PRIME" PUMPS - - MIXERS - HOISTS
Manufactured by
THE JAEGER MACHINE COMPANY
800 DUBLIN AVENUE, COLUMBUS, OHIO

WOOLDRIDGE 3 line SCRAPERS

No matter what the working position of a WOOLDRIDGE 3 Line Scraper may be—cable pull is always straight—with no short reverse bends to cause premature cable failure. Even on a full three-quarter turn the cables are given full three-way sheave wheel support.

MAKE PAY DIRT *Pay!* WITH WOOLDRIDGE SCRAPERS

--LESS CABLE WEAR MEANS LESS CABLE AND LESS "TIME-OUT" FOR REPAIR!

Cable breakage throws men and equipment into costly non-productive idleness—and every single minute lost adds to your yardage cost. This is just one of the many reasons why it will pay you to use Wooldridge 3 Line Scrapers. Three line operation not only gives the operator greater control, but it evenly divides the load—divides and reduces cable wear and repair. Even with the addition of the third line, less cable is needed on a Wooldridge 3 Line Scraper than on most other scrapers. When a rope breaks, there's less wastage, for fewer feet are required for reeving. Get the full facts today, and then let us prove Wooldridge 3 Line operation to you on your own job. Write for bulletin.

WOOLDRIDGE
MANUFACTURING COMPANY—SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS
BULLDOZERS • RIPPERS
• TRAIL BUILDERS •

"The Navy gave them to us for Production Excellence"

They're owned by 7000 people who pulled together, working hard

"Out there on the Roebling staff you see two emblems. The top one, bearing the crossed cannons, is the Naval Ordnance flag. And below that is a pennant, "E" ... the United States Navy's flag of Excellence. The Navy "E" is something to be strived for—at sea, in peacetime, officers and men must work all year to reach the standard of excellence that bestows an "E" on a stack, for engineering; on a turret, for gunnery; on a radio shack, for communications. Ashore, it's given with the Ordnance flag for another kind of excellence – the kind you get from seven thousand heads and fourteen thousand hands that Roebling stands for ... Production Excellence.

When the Navy gave these flags to Roebling, they also pinned an "E" on every man-jack of the Roebling crew. You'll see it proudly worn by the men who are today filling your wire rope needs. They're working with the pride and satisfaction of master-craftsmen, knowing they have pleased one of the world's most demanding customers, just as they'll please you.

The men who man the open hearths are putting something extra into every melt of Roebling "Blue Center" Steel. Something they gained the day they got their "E", when they watched these same hearths swallow a fragment of enemy bomb from the hand of a Naval officer, to be returned with interest to those who menace American liberty.

You'll get that "something extra" if you're in the Navy, using Roebling Wire Rope for any one of its multitude of shipboard purposes, such as the slings that hoist a plane aboard its mother ship.

You'll get it also if you're buying Roebling "Blue Center" for any of the vital industrial uses that must go night and day, non-stop ... for logging camps, for mines or elevators, for plant hoists or oil well drilling lines. You'll get it every time you use the Roebling trade-mark as your buying guide."

JR ROEBLING

Roebling Research, plant facilities; Roebling Quality Control and Engineering ... for years they've been putting extras into "Blue Center" Wire Rope. Extras that you need today, wherever wire rope has a dependable, long-lived job to do.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

THAT'S THE ONLY WAY TO MAKE

ROEBLING

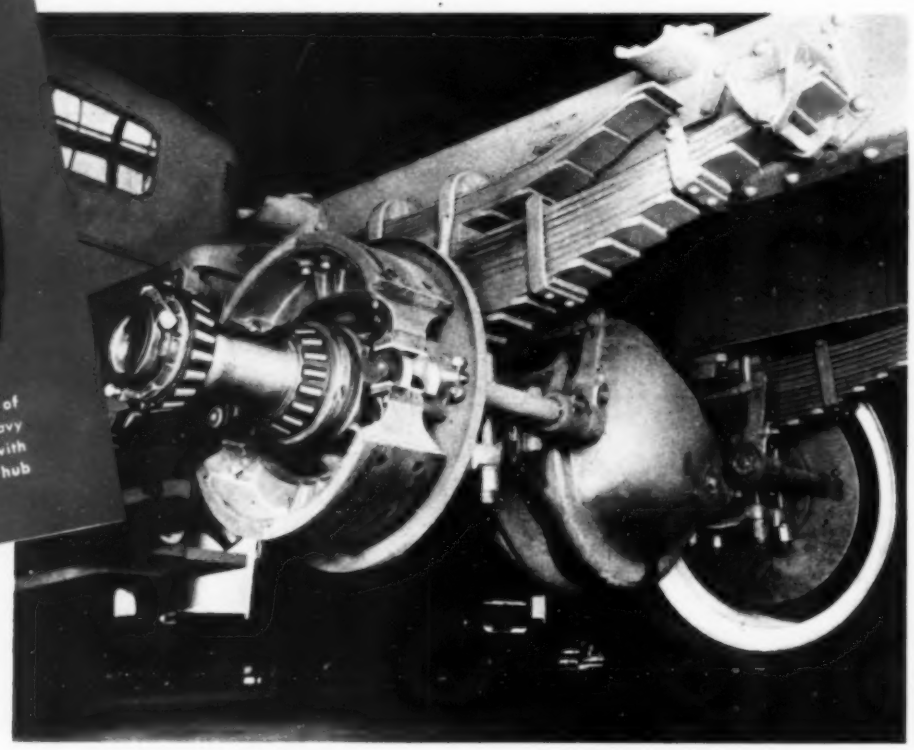
"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED

One lubricant for all Seasons

After 34,000 MILES, unretouched photos of wheel bearings lubricated with Texaco Marfak Heavy Duty. Note that all rollers are well covered with lubricant, despite 8 months' hard use, with hub temperatures averaging upward of 250° F



HUNDREDS of the Country's largest fleet operators have stopped changing of wheel-bearing lubricant seasonally . . . they are now using *Texaco Marfak Heavy Duty.*

Texaco Marfak Heavy Duty lubricates effectively winter and summer . . . doesn't leak out at highest operating bearing temperatures. It keeps off brakes, assuring safer braking in all seasons.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Automotive Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

FOR YOUR ENJOYMENT

FRED ALLEN every Sunday night. See your local newspaper for time and station.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for War Needs.

To make the most of your
TIRE CERTIFICATES
get the Goodyear that fits your job!

In Rock Work
GOODYEAR
HARD ROCK LUG
Tough, massive close-spaced lugs protect the carcass from cutting; provide equal driving power forward or backward; do not hold rock.

In Mud and Marsh
GOODYEAR
SURE-GRIP GRADER
Traction provided by deep, wide and evenly-spaced driving bars; a self-cleaning, open tread.

In Sand and Soft Dirt
GOODYEAR
EARTH MOVER
Deep, wide-spaced All-Weather tread provides equal driving power forward or backward; prevents side-slip on grades.

● Nobody knows how the rubber situation will shape up a few months hence.

So it's to your own interest to get the sturdiest, hardest-working, longest-wearing tires you can buy.

By the experience of countless users that means Goodyears.

And no wonder! For those three stalwarts pictured above carry the toughest treads ever put on off-the-road tires. What's more, their carcasses are stoutly armored against bruises, and so strong—they are best for retreading.

Pick out the one best suited to your needs, and see your Goodyear dealer about it today. Against a future packed with uncertainty, you can't buy better tire insurance!

No matter what kind of tires you have been using, now's the time to change to Goodyears!

GOODYEAR

All-Weather—T. M. The Goodyear Tire & Rubber Company

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

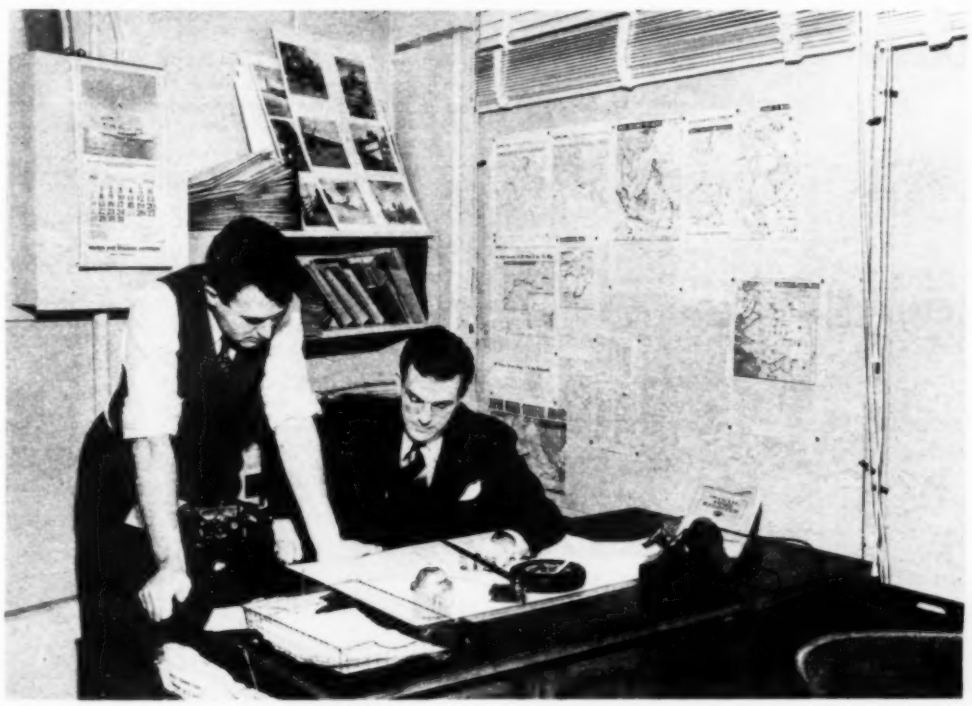
Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24 | MARCH, 1942 | Number 3

Plywood Panels FORM REMOVABLE BLACKOUT SCREENS

WINDOW OPENINGS are covered with removable plywood panels cut accurately to proper dimensions. Material recommended for blackout use is usually 5/16-in. sheathing or ¼- to ⅜-in. wallboard.



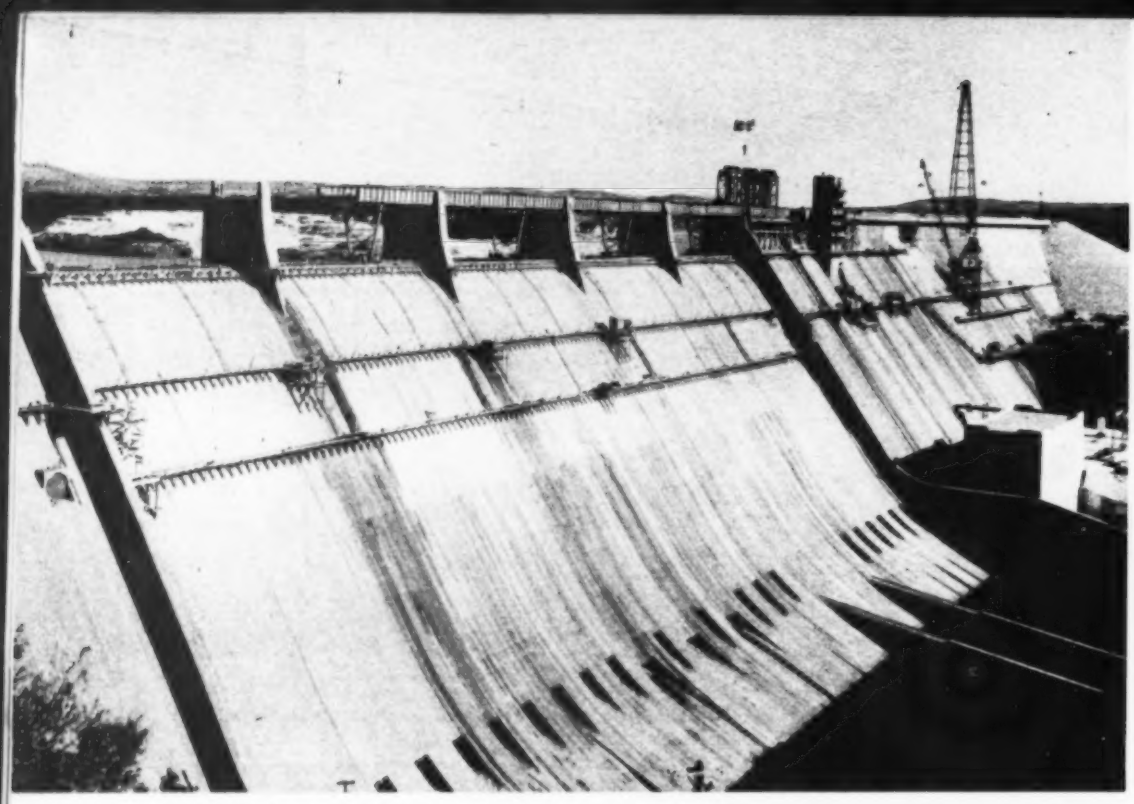
WITH PLYWOOD PANELS IN PLACE window openings are effectively sealed to prevent light showing on outside of building.

A CURTAIN OF PLYWOOD has been lowered around industries up and down the Pacific Coast to permit night production of vital war materials while blackouts are in effect. Biggest plywood-for-blackout order taken during opening days of the war was the 233,000 sq.ft. purchased to cover windows of the main plant at Seattle, Wash., of an aircraft manufacturing company producing four-motor bombers. Six different Washington plywood firms shared in filling the order which called for immediate delivery.

Another noteworthy war installation of plywood was that at Fort Lewis where 40,000 ft. of the panels were slipped into place to screen in night lights at mess halls, offices and utility buildings. These sheets are attached so that they can easily and quickly be removed during the day and replaced during blackout periods.

Usually the 5/16-in. Plyscord (sheathing) grade or ¼- or ⅜-in. Plywall (wallboard) quality are used. As these grades are manufactured for interior

(Continued on page 120)

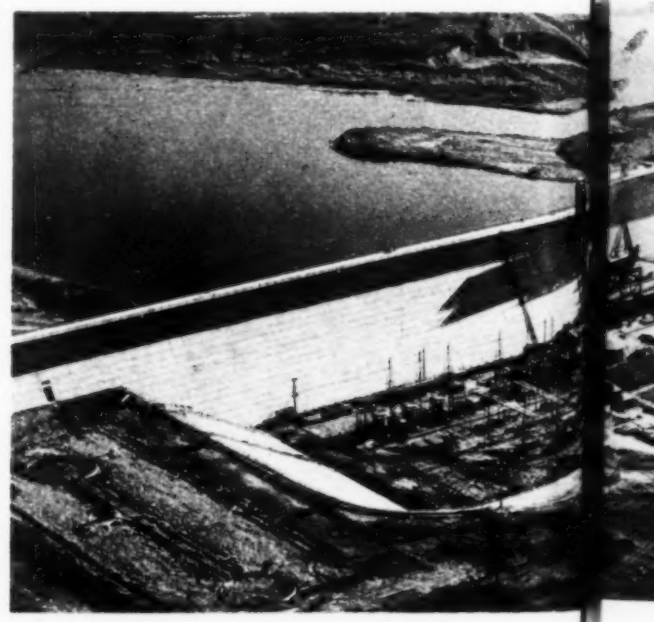


CREST HEIGHT OF 270 FT. is reached by Marshall Ford Dam, U. S. Bureau of Reclamation structure for flood control, irrigation and power development on Colorado River of Texas, 18 mi. northwest of Austin. Dam built by Brown & Root, Inc., and McKenzie Construction Co., comprises 2,423-ft.-long concrete gravity section containing 1,864,000 cu.yd. of masonry, flanked on both ends by embankments of earth, rock and gravel involving 1,715,000 cu.yd., built by Cage Bros. and W. W. Vann & Co. Marshall Ford structure is world's fifth largest concrete dam. Final construction involves building steel bridge over spillway to carry two lanes of traffic.

Photo, Albert Rothschild

PUMPED CONCRETE is used to pave roadway deck of Gowanus Elevated Parkway in Brooklyn, N. Y., steel structure supported by two-legged bents, described in Construction Methods for December, 1941, p. 42. Deck is 7½ in. thick and has maximum width of 72 ft. Fed by 1-cu.yd.

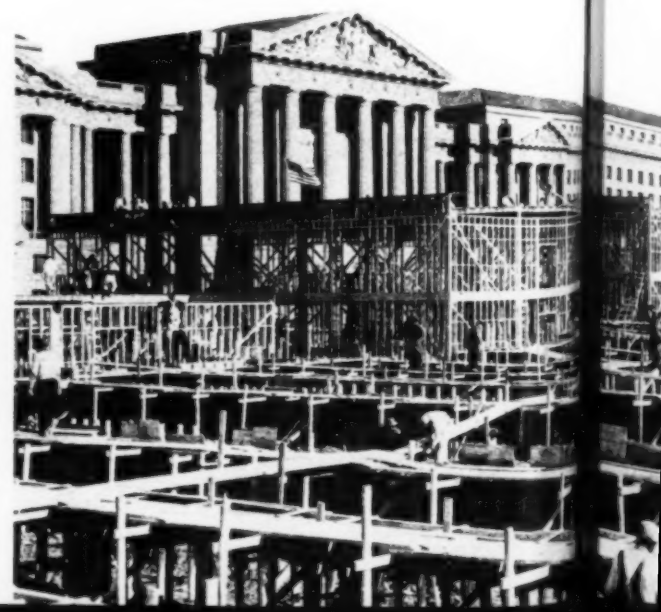
THIS MONTH'S NEWS REEL

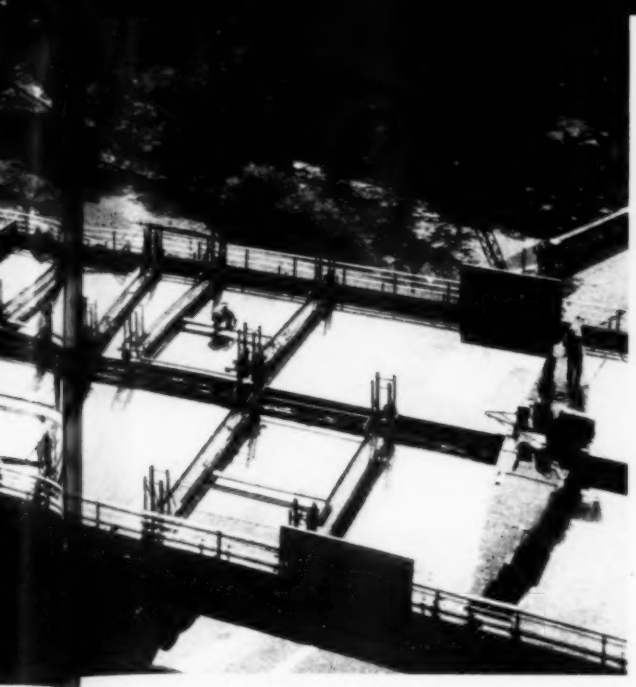


CHEROKEE DAM, Tennessee Valley Authority concrete structure 175 ft. high and 1,689 ft. long on Holston River near Knoxville, Tenn., was officially dedicated on Dec. 7, 1941, only 16

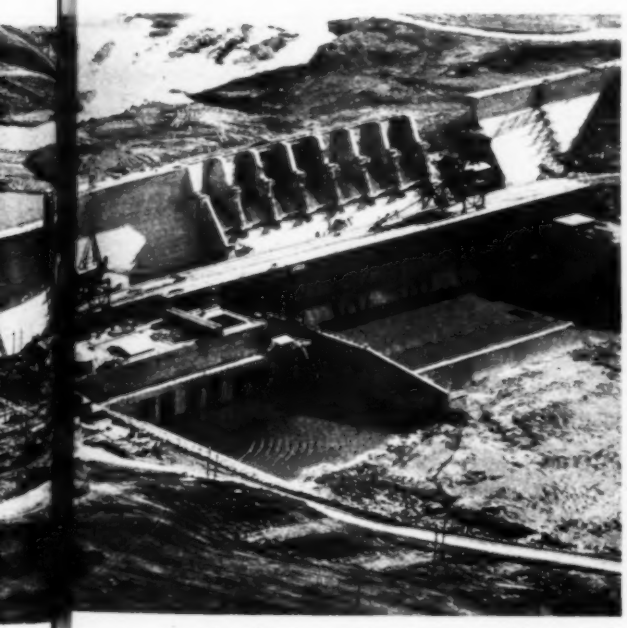
BRITISH ENGINEER TROOPS (below) bridge stream "somewhere in England" using latest type of army equipment. Troops are being trained in methods of crossing rivers in enemy territory when it becomes turn of Britain to invade, according to caption passed by British censor.

Wide World Photo





paver, Pumpcrete unit, set up at street level by Corbetta Construction Co., delivers concrete to deck through 8-in. pipe line reaching length of 1,200 ft. Structure was designed by Madigan-Hyland, consulting engineer, for Triborough Bridge Authority.



months after its construction was authorized. On this project Lee G. Warren served as project manager, G. E. Murphy, superintendent, and T. F. Taylor, construction engineer.

Assoc. Press Photo

PAVING IN PANAMA is rushed by concrete crew on 48-mi. route linking ends of Panama Canal. Army trucks early in February made first trip over road, although 7-mi. section through jungle still remains to be paved

HOUSES ON STILTS are erected under supervision of U. S. Army Engineers to provide living quarters for civilian personnel engaged in construction of new Army base in Trinidad where rainy season extends from May to November, with annual precipitation of 64 in. at Port-of-Spain. Houses are fully screened and raised above ground level to provide ventilation and protection against animal pests.

MUD MOUNTAIN DAM (below), earth and rock-fill structure on White River southwest of Seattle, Wash., reaches full height of 425 ft. in narrow canyon. Built for U. S. Engineer Department by Guy F. Atkinson Co., structure contains 2,230,000 cu.yd. of material, including 412,000 cu.yd. of rolled earth core, processed in drying plant and placed under protective covering of huge canvas "tent".

TO ACCOMMODATE EXPANDING PERSONNEL (below) in Government departments in Washington, D. C., as result of war demands, construction of emergency wood-frame buildings is rushed to house influx of workers. Project illustrated is located on Constitution Ave.

Wide World Photo

In 100 Days

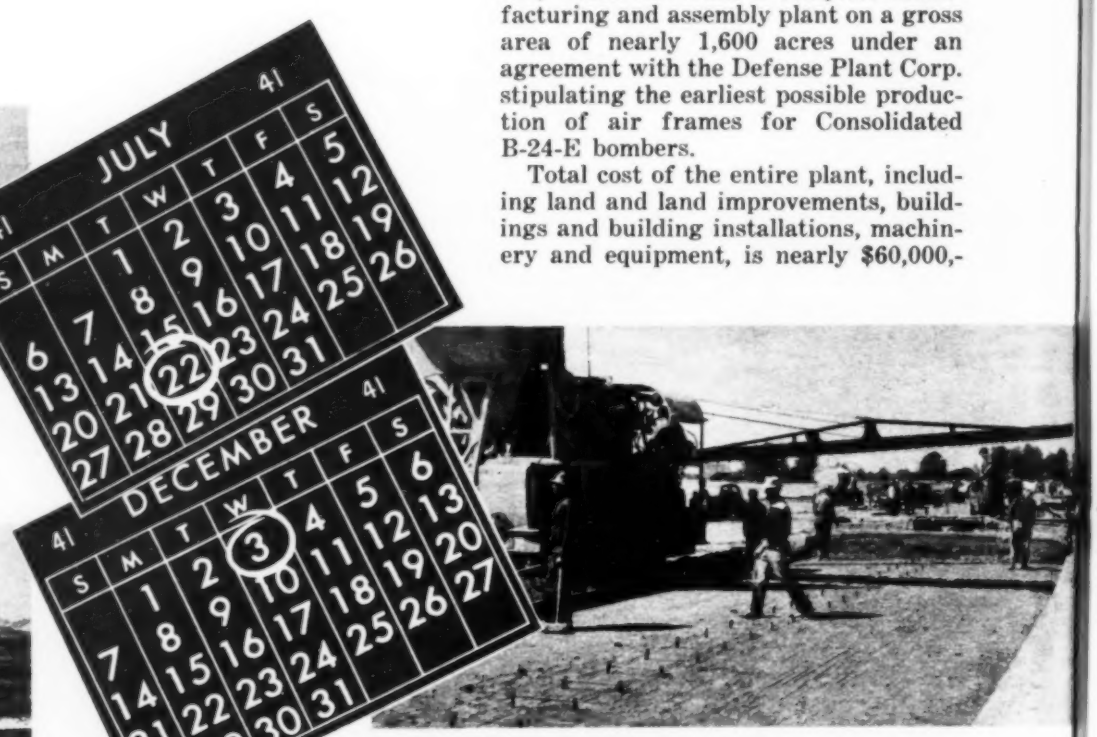
CONTRACTOR GRADES, DRAINS AND PAVES

$3,900,000 Airport

PACED BY A SCHEDULE providing only 100 calendar days for the job, construction of an 825-acre airport for the Willow Run bomber plant at Ypsilanti, Mich., involving 550,000 cu.yd. of earthmoving, installation of 72 mi. of pipe for a drainage system and the laying of 153 acres of concrete paving, was completed recently by Julius Porath & Son Co., contractor, of Detroit. Only a tremendous volume of construction equipment and keen coordination of scattered operations made it possible to meet the progress rates required by Albert Kahn Associated Architects & Engineers, Inc., designer and supervisor of the project for the Ford Motor Co., which has built a complete manufacturing and assembly plant on a gross area of nearly 1,600 acres under an agreement with the Defense Plant Corp. stipulating the earliest possible production of air frames for Consolidated B-24-E bombers.

Total cost of the entire plant, including land and land improvements, buildings and building installations, machinery and equipment, is nearly $60,000,-

TRAIN OF 18-YD. SCRAPERS drawn by tractors fitted with pusher plates loads units in sequence to heaped capacity. Each scraper while loading receives added tractive effort supplied by all tractors behind it, including pusher tractor at rear end of train.

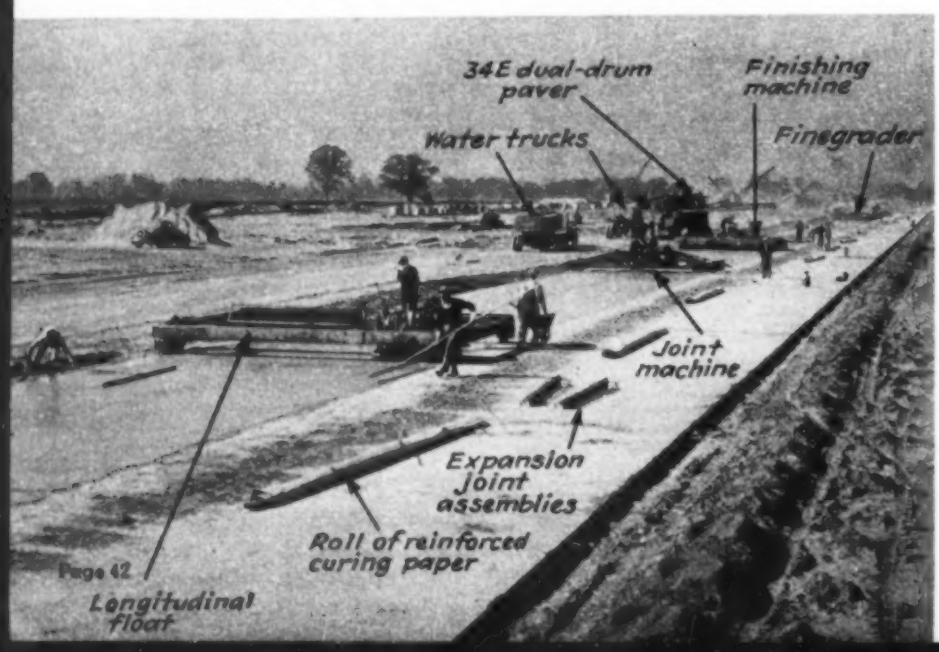


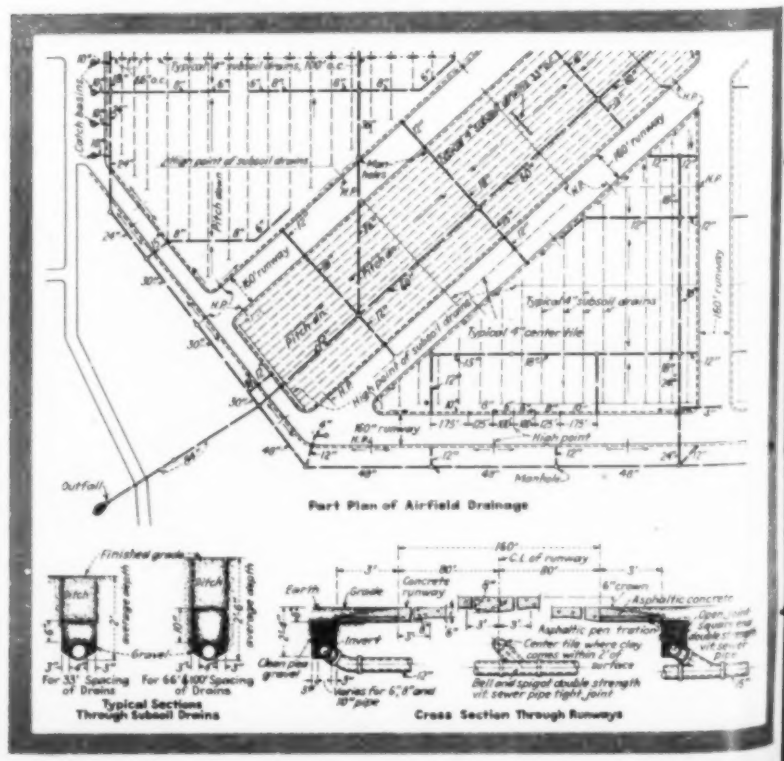
SUCCESSIVE 20-FT. LANES are placed adjacent to previously completed lanes, with keyed construction joints between them. Large dual-drum paver travels outside forms.

PREDRAINING OF SAND SUBSTRATUM by long line of Moretrench well points dries up soil for trench excavation and sewer construction by Chris Nelsen, subcontractor.

ELABORATE GRID (below) of subdrains and runway edge drains is designed to provide quick discharge of storm water and to prevent ground-water from rising to level that might cause frost damage to pavement or to intermediate turf areas.

EACH OF FOUR PAVING OUTFITS (below) on huge airport job, requiring placement of 740,000 sq.yd. of concrete slab, employs mechanized train of equipment comprising patrol grader, finegrader, 34E dual-drum paver, finishing machine, joint machine and longitudinal float.





ON OTHER SEWER CONSTRUCTION. Gargaro Co. employs Jaeger well points to dry trench, 19 ft. deep at this point, for laying 84-in. sanitary drain 1,800 ft. in length from bomber plant.

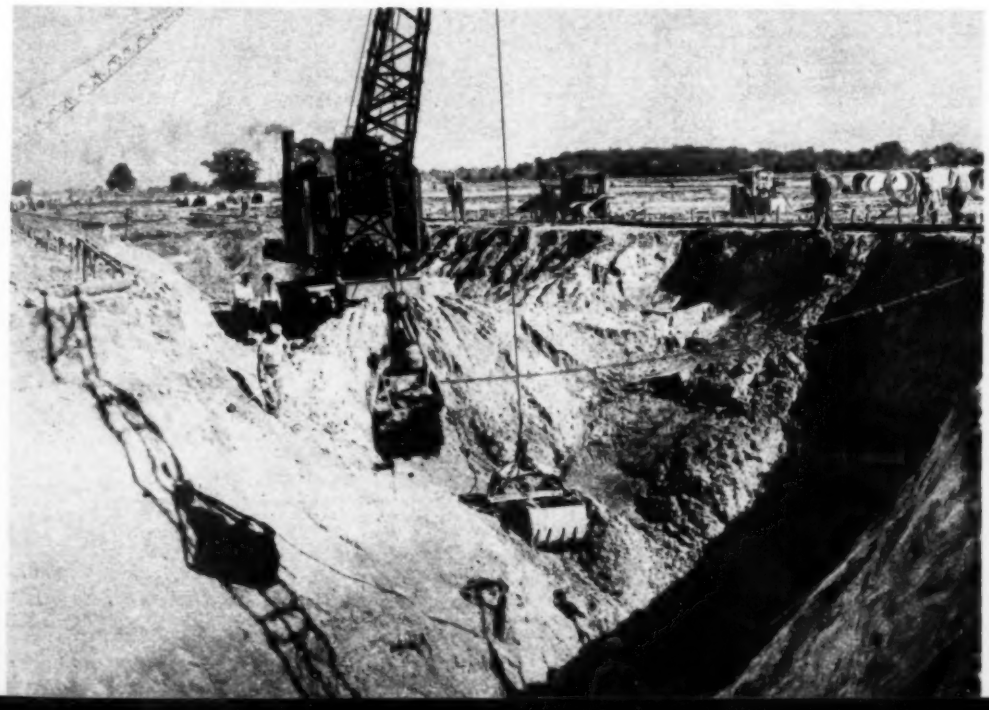
STEAM HAMMERS hung from crane booms drive steel sheeting for trench 36 ft. deep excavated by Julius Porath & Son Co. on line of 84-in. outfall sewer.

000. The January issue of *Construction Methods*, p. 42, told how a group of contractors worked with the Ford Motor Co. and the engineer-architects to complete the 62-acre main building and auxiliary facilities of the manufacturing plant in seven months.

No seven-month schedule sufficed for construction of the airport. To beat the first severe frosts of late autumn, the airport schedule set Nov. 6 as the final day for the placing of concrete pavement. Grading of the site started on July 22, when the initial tractor-scraper outfit took the first bite of the 550,000 cu.yd. of earth to be moved. Only 101 calendar days intervened between this date and Nov. 6. The first drainage crew began digging sewer trench on Aug. 12. Other sewer outfits rapidly moved into position on the drainage lines to complete the sewer system by the scheduled date of Oct. 15, just 65 calendar days after the start of drainage work. The first unit of a battery of four complete paving outfits began placing and finishing concrete pavement on Aug. 12, inaugurating a program of laying slab 16 hr. a day and six days a week for the scheduled period of 77 calendar days from the starting date until Nov. 6. Because of delays suffered during the exceptionally wet month of October, the last batch on the field was not placed until Dec. 3.

Coordinated Enterprise—Experienced top management and skilled coordination by Julius Porath & Son Co. of a unified organization comprising a number of capable construction firms enabled the contractor to hold progress in line with the stiff schedule laid down

RUNNING SAND (below) in banks of deep trench for 48-in. sewer is dried up by Moretrench well points for excavation on construction section built under subcontract by Drainage Contractors.



BRACED STEEL SHEETING (below) retains sides of 36-ft. cut for 84-in. outlall delivering airport drainage to Willow Run.

LADDER-TYPE TRENCHING MACHINE makes 14-ft. cut 44 in. wide in predrained soil for 36-in. sewer laid at rate of 40 to 45 pipe lengths per 8-hr. shift by Drainage Contractors, subcontractor.

MANHOLE CONSTRUCTION by Porath crews is expedited by use of steel-shell caissons and motorized clamshell cranes.

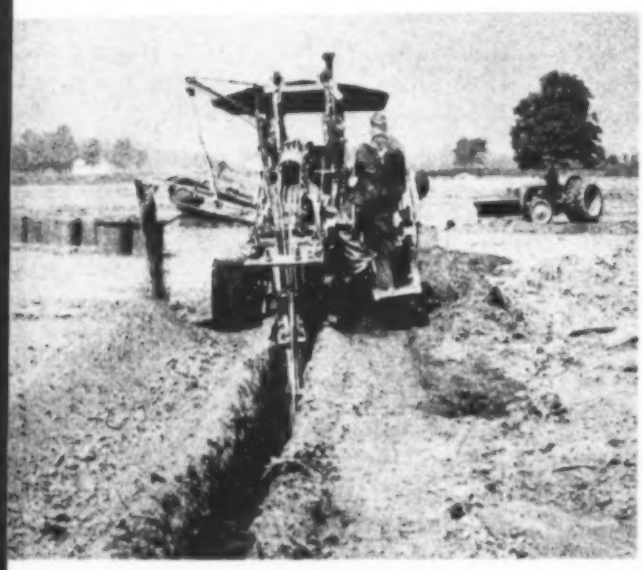
for the job, except during the unusually wet October. The associated contractors put into the field an imposing assemblage of equipment including among its hundreds of units 33 cranes, 24 systems of well points and four complete paving plants, each one headed by a 34E dual-drum mixer.

Total value of airport construction work performed by the amalgamated working forces amounted to nearly $3,900,000. Original value of three contracts for grading, drainage and pavement awarded on the basis of unit-price or lump-sum bids were increased during the course of the work as a result of expansion of the original plan. When awarded, the contracts were estimated to possess values of about $335,000 for grading, $800,000 for drainage, and $1,400,000 for pavement.

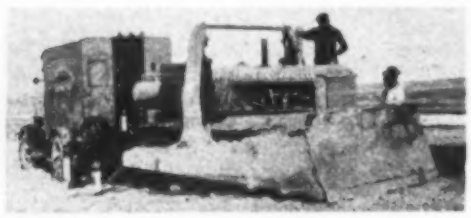
Features of Field — Natural ground on the site in general consisted of 4 to 5 ft. of coarse sand interposed between a thin layer of topsoil and a lower layer of clay up to 4 ft. in depth. Under this clay is a stratum about 4 ft. thick of fine, water-bearing sand or silt which is a quick-running material. The wet, running sand rests on a bottom stratum of hard clay encountered at depths of 15 to 18 ft. below the surface.

A high groundwater table rising to within 2 or 3 ft. of the original surface made it necessary to install artificial drainage for the airfield. On the drained natural soil subgrade of coarse sand and small gravel are placed the airport's concrete runways, aprons and taxiways, unreinforced except for the addition of 56-lb. mesh where the con-

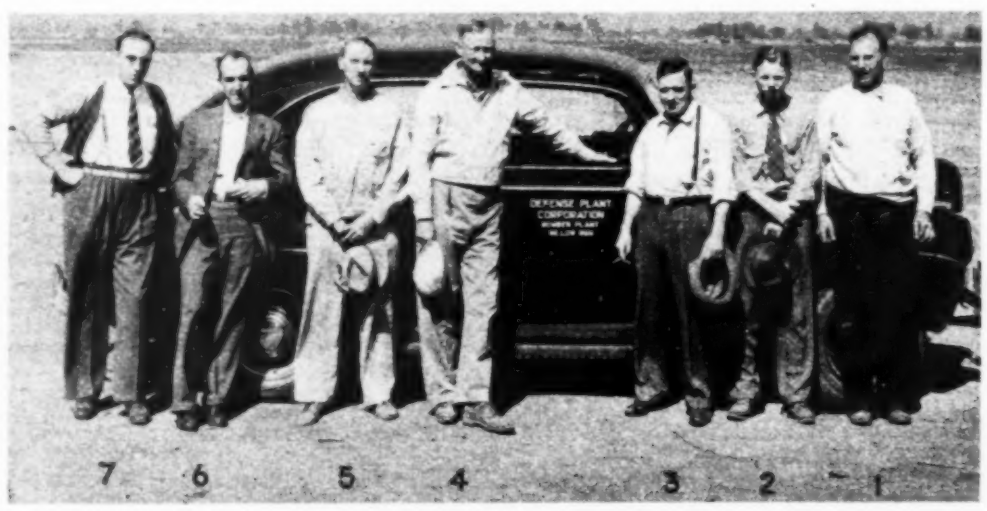
(Continued on page 110)



FOR ELECTRIC POWER LINE on airport, George A. Odien, Inc., working under agreement with John Miller Electric Co., operates wheel-type ditching machine to cut trench in which 1¾-in. pipe conduit will be laid.



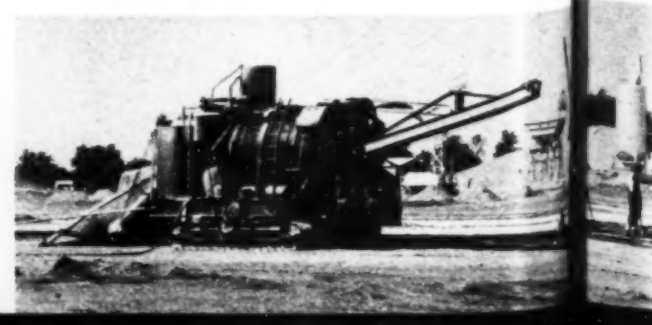
SERVICE TRUCK carrying all grades of greases and engine oils provides fast one-stop lubrication for equipment units on job. Porath organization operates two of these trucks.

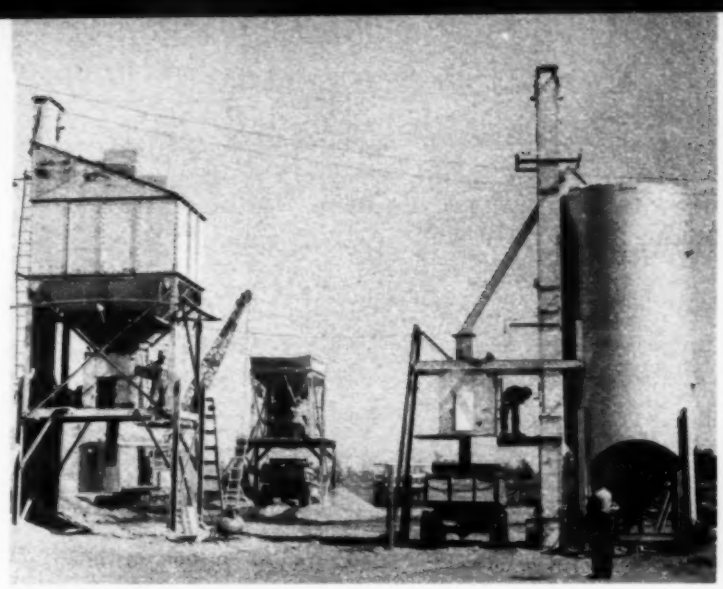


HUGE AIRPORT JOB is carried swiftly to completion under supervision of: (Starting at right) (1) GLENN GUTCHER, manager of concrete supply, (2) GLENN CARGILL, general superintendent, and (3) WILLIAM E. DUFFY, general manager, Julius Porath & Son Co.; (4). MANLEY STEGEMAN, superintending engineer, Albert Kahn Associated Architects & Engineers, Inc.; (5) WILLIAM DORRANCE, project engineer, Ford Motor Co; (6) CHARLES V. PARTRIDGE, chief timekeeper, and (7) A. ZAK, chief cost clerk, Julius Porath & Son Co.

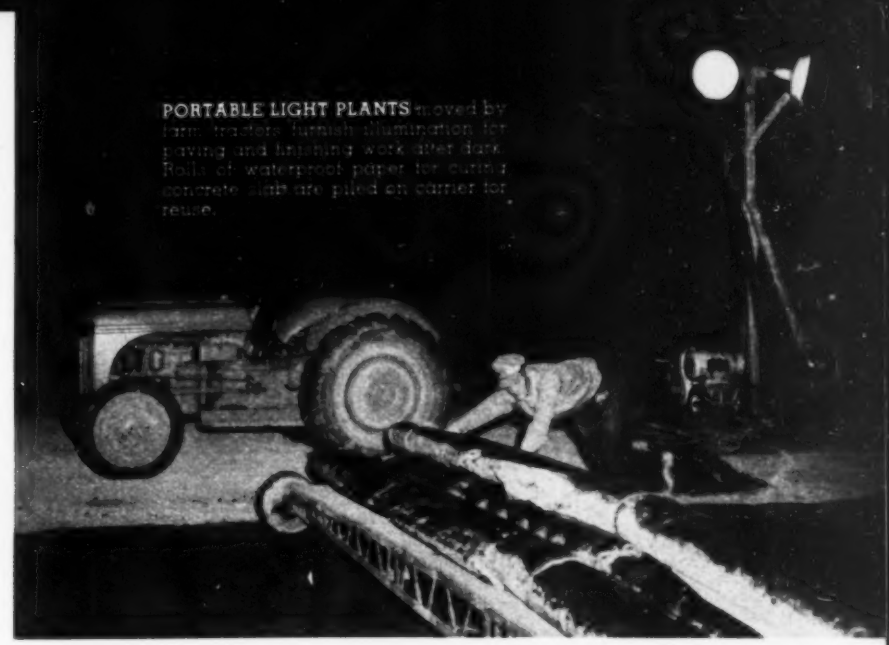
WINCH-PROPELLED FINEGRADER (below) traveling on steel forms and on previously completed pavement cuts subgrade to cross-section profile and deposits excess spoil outside forms.

EACH OF TWO PAVING OUTFITS (below) operated by Lewis & Frisinger Co. and E. B. Schwaderer includes 34E dual-drum mixer to which dry batches are delivered from plant in background.



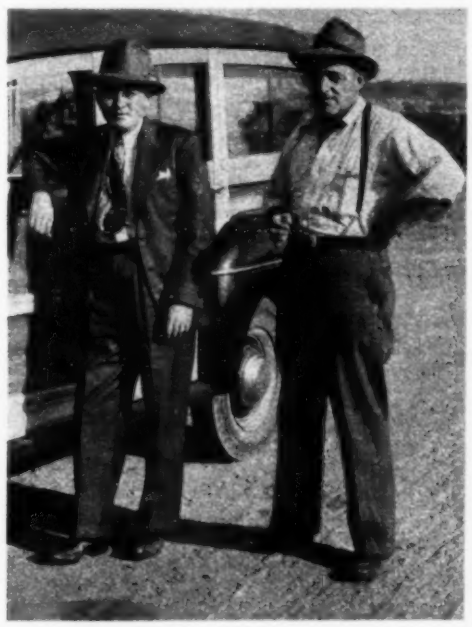


TWO BULK CEMENT PLANTS serve batch truck fleet hauling from plant of Lewis & Frisinger Co. and E. B. Schwaderer.



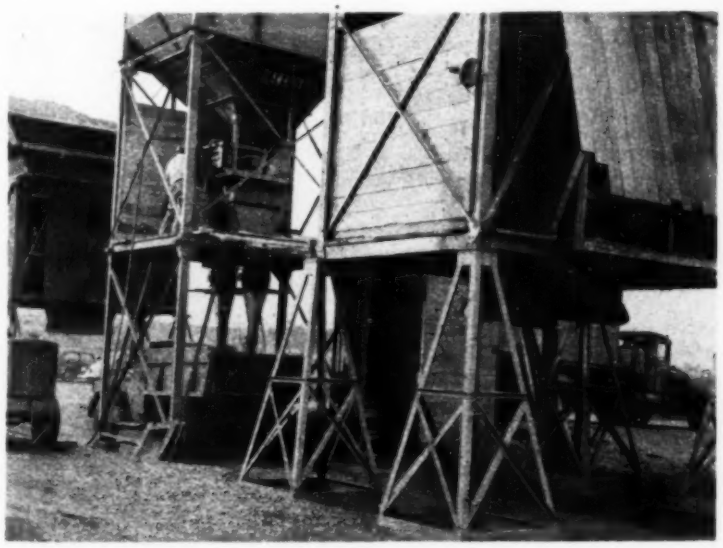
PORTABLE LIGHT PLANTS moved by farm tractors furnish illumination for paving and finishing work after dark. Rolls of waterproof paper for curing concrete slab are piled on carrier for reuse.

JOB ENGINEERING is executed under direction of SIMPSON ALBION, engineer for Julius Porath & Son Co.



MANIFOLD CONSTRUCTION ACTIVITIES of Julius Porath & Son Co. are directed by EDWARD W. PORATH (left), with able assistance of WILLIAM E. DUFFY, general manager

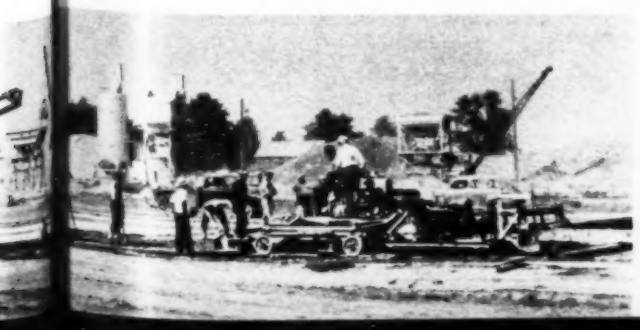
OUTFALL SEWER in 36-ft. cut is responsibility of JOHN SYPNIEWSKI (left), superintendent of deep sewer work and tunneling for Porath firm, while M. M. MARTENS (wearing cap), grading superintendent, directs operations of large scraper fleet.

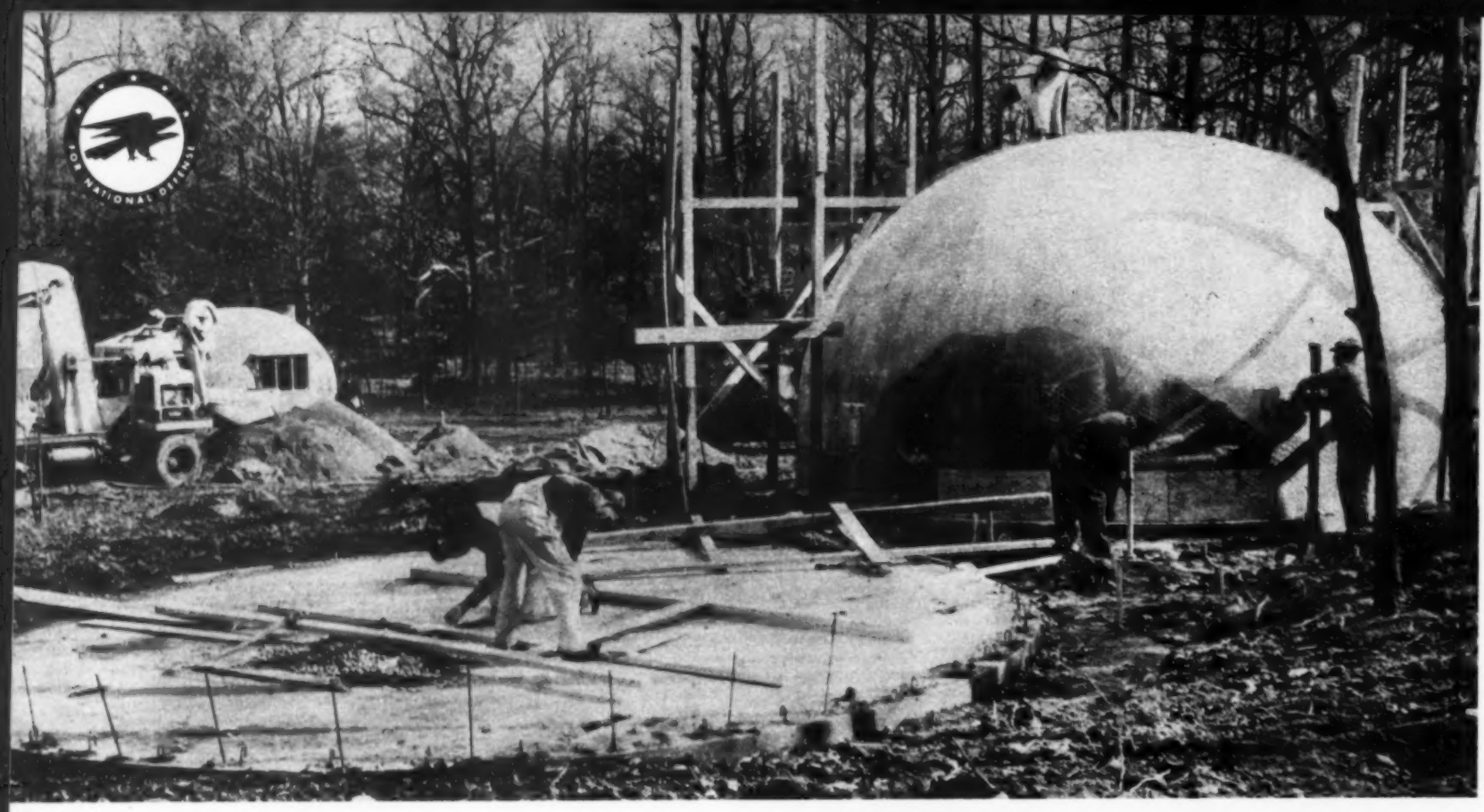


DUPLICATE CHARGING HOPPERS for cement and each size of aggregate speed loading of Porath two-batch trucks.

MIXING WATER delivered in tank trucks is transferred by portable pump to tank on paver.

ROLLS OF WATERPROOF PAPER (below) cover concrete for curing. Airport job uses 800 rolls of Sisalkraft, each 60x22½ ft. in size, to protect large area of slab placed by four paving outfits.





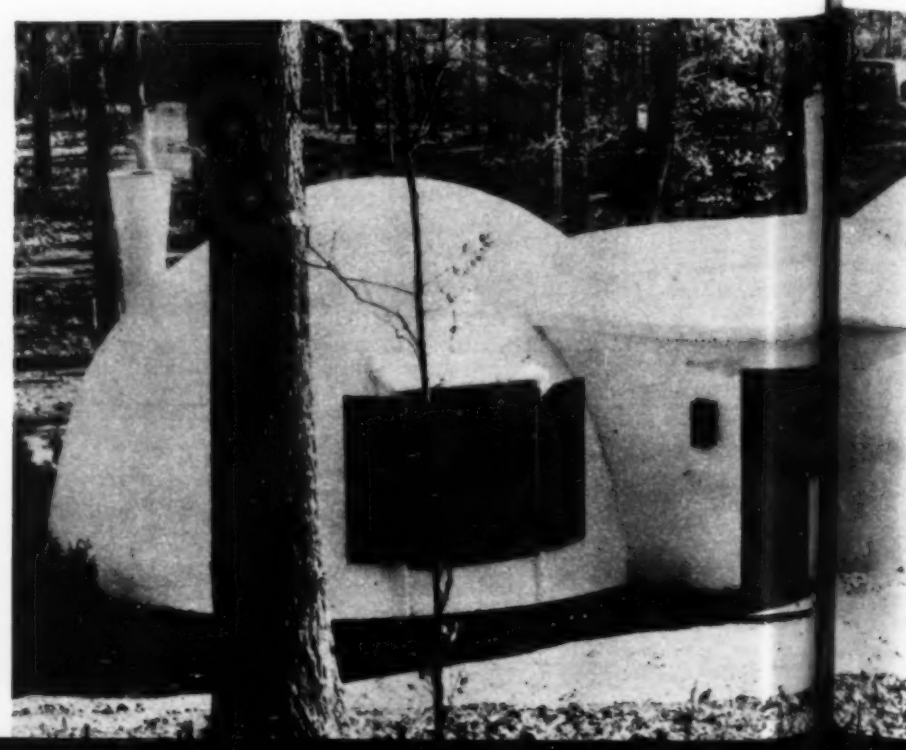
CONCRETE BASE, 23 ft. in diameter, for half of twin-igloo housing unit, is poured with steel hooks embedded in perimeter to anchor ring of pipe to which balloon form is laced before inflation. In left background is Gunite mixing unit.

Balloon Forms

Inflated With Air Mold Gunite Shells for Twin-Igloo Houses

FORM IS ANCHORED to circular concrete base by rope lacing around ring of pipe held in place by hooks embedded in concrete and spaced at short distances around perimeter.

DEFLATED BALLOON FORM (below) of rubberized cotton fabric is rolled out to cover circular concrete base of house unit.



NEW CONSTRUCTION TECHNIQUE employing the combination of inflatable rubberized cotton fabric "balloon" forms, over which concrete is shot by the Gunite process, has been demonstrated on a Defense Homes Corp. project at Falls Church, Va., near Washington. The balloons, which may be made in either hemispherical or semicylindrical shape of any practical size desired, may be removed after the initial layer of Gunite has hardened for 24 hr. and be used again for subsequent units.

The Falls Church Defense Homes project is devoted to the production of attractive, inexpensive dwellings, each comprised of two hemispherical sections erected several feet apart and connected with a covered areaway divided into entrance hall, bath and kitchen. One of the hemispheres is divided by a wall into two ample bedrooms and the other is a spacious living room with fireplace. A surprising amount of closet space is obtained by taking advantage of the corner areas wherever vertical walls are joined to the arc of the outer shell, or dome.

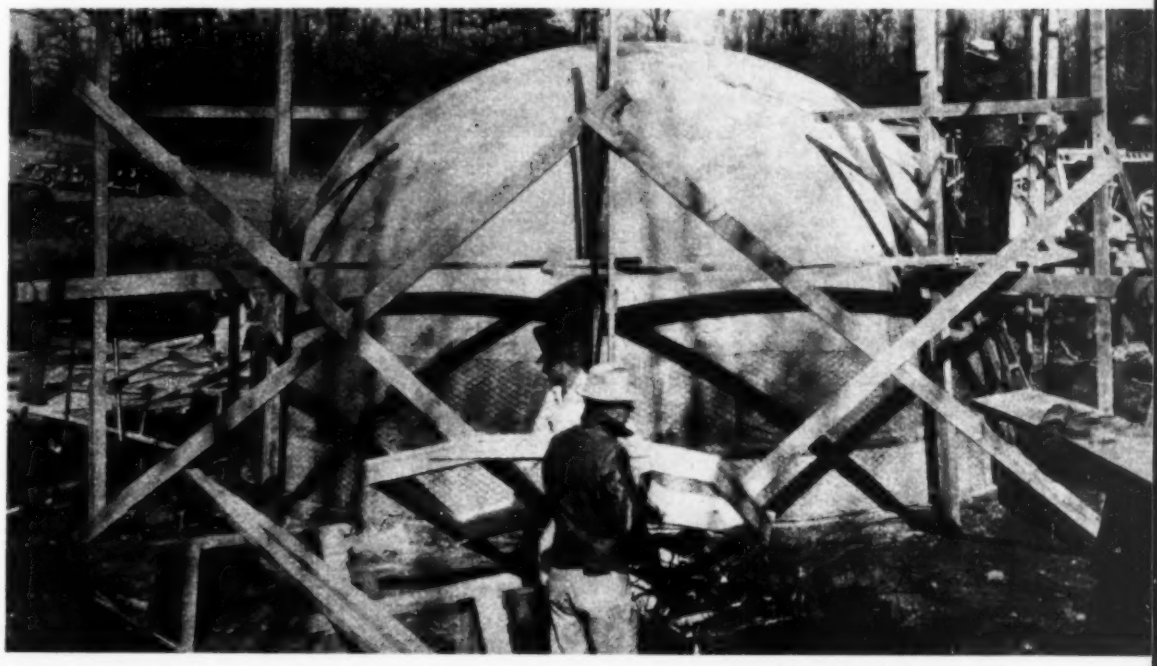
Originator of the balloon building process and designer of the houses under construction at Falls Church, is Wallace Neff, West Coast architect. Construction on the project was by the Case Construction Co., of San Pedro, Calif., and the balloons, or inflatable hemispheres, were especially designed for the purpose by Goodyear Tire & Rubber Co., pioneer builder of airships and balloons for United States Army and Navy.

Vern D. Case, head of the construction company, estimates that concrete houses identical or similar to those now being erected at Falls Church could be produced at the rate of 100 in 60 days or 200 in 90 days, using only four balloon forms in the construction cycle.

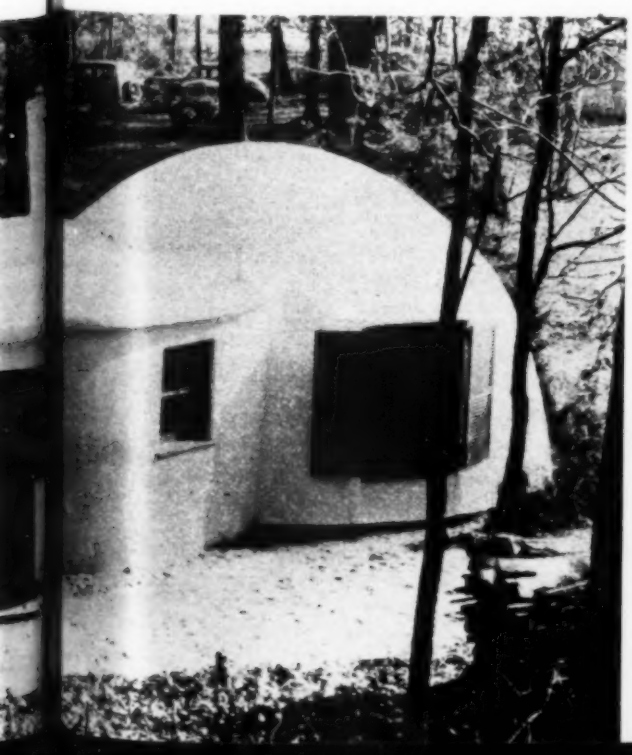
First step in the construction procedure is preparation of a circular concrete floor, or base, approximately 23 ft. in diameter. Spaced at frequent intervals around the outer perimeter and

(Continued on page 124)

WITH COMPRESSED AIR balloon form is inflated to pressure of 1½ lb. per sq.in. preparatory to receiving coating of Gunite shot over mesh.



FULLY INFLATED, form is ready to receive first coating of Gunite to form inner shell of hemispherical housing unit, reinforced with wire mesh.



TWO HEMISPHERES (left) of completed housing unit, containing two 10x14-ft. bedrooms and a large living room, are connected by covered areaway housing entrance hall, bathroom and kitchen.

GUNITE IS SHOT (right) on to surface of inflated form to form inner shell 1 in. thick. Insulation layer, 1½ in. thick, of ground pulp in asphalt emulsion is then applied and covered with exterior Gunite coating from 2 to 3 in. thick.

Army Engineers

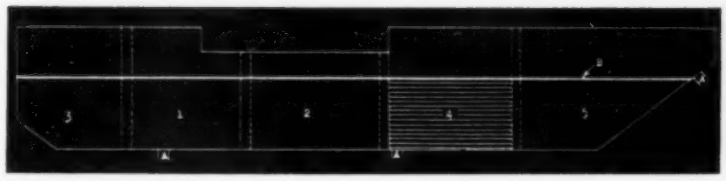
USE RUBBER BOATS FOR RIVER CROSSINGS

AIR-INFLATED BOAT is launched and steel saddle is placed by A-frame derrick on rear end of truck to act as stiffener to support loads of mechanized equipment to be ferried across stream.

THE ACCOMPANYING PHOTOGRAPHS illustrate how Army Engineer troops in training at Fort Knox, Ky., use modern mobile equipment to effect a river crossing where no bridges exist. Truck with A-frame derrick on rear end delivers necessary materiel to site. Large rubber boat is inflated with air supplied by portable compressor and launched into water. Derrick on truck places steel saddle which fits over top of boat, acting as a stiffening member and providing a platform for supporting channel-shaped tracks on to which mechanized equipment is rolled. One of the pictures shows a pair of these floating units lashed together to ferry heavy motorized equipment across stream. The inflated boat units may also be used as supports for a ponton bridge deck.

Acme Photos

FERRY SERVICE (below) across stream where no bridge exists is provided by lashing pair of boats together and placing channel-shaped tracks on saddles to facilitate loading of crawler or wheel-mounted mechanized equipment.



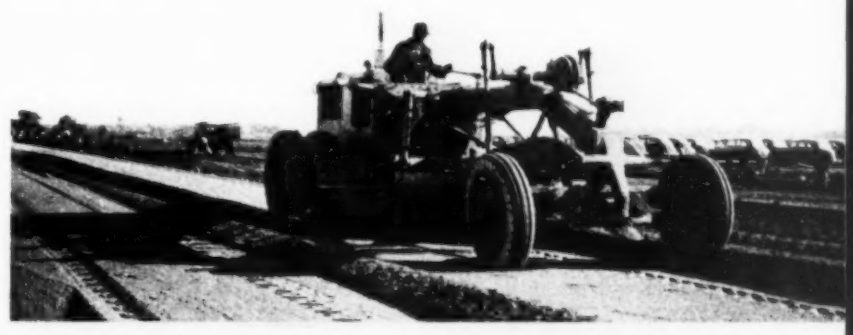
CONSTRUCTION LAYOUT for major parking field comprises five work areas separated by 50-ft. strips in which equipment may turn around at end of each trip over 25-ft. lanes set up for soil-cement processing, as indicated in lower part of area 4. Lanes range from 560 ft. in length in area 1 to 1,065 ft. in area 5. Concrete entrance roads are marked A, and concrete curb and gutter to drain upper part of area are marked B.

Soil Cement Pavement

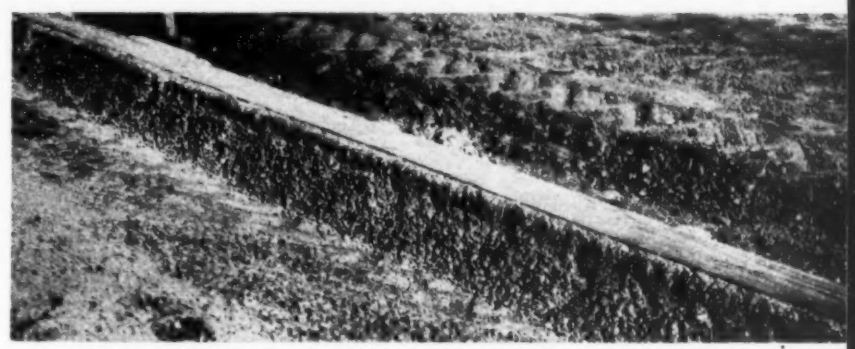
Utilizes Mill Tailings From Metal Mines

SOIL-CEMENT CONSTRUCTION employing 90 percent mill chats, finely ground quartz rock fragments from waste dumps of ore treatment plants at metal mines, has been used to pave 360,000 sq.yd. of motor parking areas at a bomber assembly plant in the Southwest. The pavement design called for a 6-in. compacted thickness of soil-cement utilizing a soil combination consisting of 90 percent by weight of mill chats and 10 percent of loam topsoil from the plant site. To this

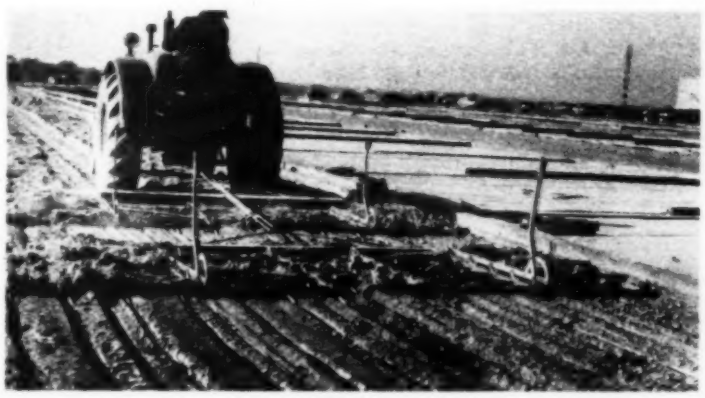
1 PREPARATORY TO PLACING MATERIALS for chat soil-cement construction in 25-ft. lane, edge forms of 6x6-in. S4S pine are set to line and grade and nailed to 2x4x20-in. oak stakes. Soil is tamped under forms, which are spliced at joints with 2x6-in. by 2-ft. scabs. Soil subgrade inside forms is bladed and compacted with sheepsfoot and pneumatic-tired rollers to receive chats.



2 MILL TAILINGS, or chats, consisting of finely ground, angular quartz rock fragments wasted by ore treatment plants, are dumped on grade and distributed uniformly with motor patrols between forms.



3 AFTER CHATS have been spread across subgrade, they are pulled in at each edge as shown, and surface of material then is bladed flat to receive soil and cement.



5 PORTLAND CEMENT dumped on top of soil and chats is spread by spike tooth harrows in preparation for first mixing operation.

4 HAND SPREADING from trucks distributes soil, added in proportion of 10 percent by weight, on top of chats previously bladed flat. Soil increases density and hastens setting of final mixture. As little as 5 percent soil has been found to be sufficient for this purpose.

6 AS FIRST STEP (below) in actual processing of mixture rotary tillers driven by power take-offs from tractors work cement in to depth of about 6 in. of loosened material.

7 GANG PLOW turns material during mixing operation. Material first is plowed in toward center of lane for mixing with rotary tillers and field cultivators and then is plowed out toward forms while mixing is repeated.

8 **WITH DRY MIXING COMPLETED,** pressure distributors carrying 25-ft. spray bars apply required quantity of water across full width of lane.

9 **FOLLOWING PRESSURE DISTRIBUTORS,** rotary tillers, plows and field cultivators mix water thoroughly into material.

12 **TO AID EQUIPMENT OPERATORS,** two men keep forms clean and clearly visible during mixing and compacting of mixture.

soil mixture was added 12 percent by volume of portland cement, equal to 0.54 sacks per sq.yd. A light bituminous surface was placed on the motor parking areas after completion of the soil-cement.

Accompanying photographs show successive operations in constructing the chat soil-cement pavement. The construction contract included two parking areas for motor vehicles. As the first step in planning the job, the major parking field was laid out in five work areas to make most effective use of the construction plant, which comprised two fully equipped units capable of completing 10,000 sq.yd. per day. A 25-ft. lane was selected as the width best adapted to efficient construction by each unit. The work areas, indicated on an accompanying layout, provided lanes from 560 to 1,065 ft. long. Between the work areas were 50-ft. turnaround strips in which the equipment could reverse its direction of travel at the end of each trip. The intermediate turnaround areas were paved last, after completion of the work areas.

Prior to application on the parking areas, use of chats in soil-cement construction had been studied in the laboratories

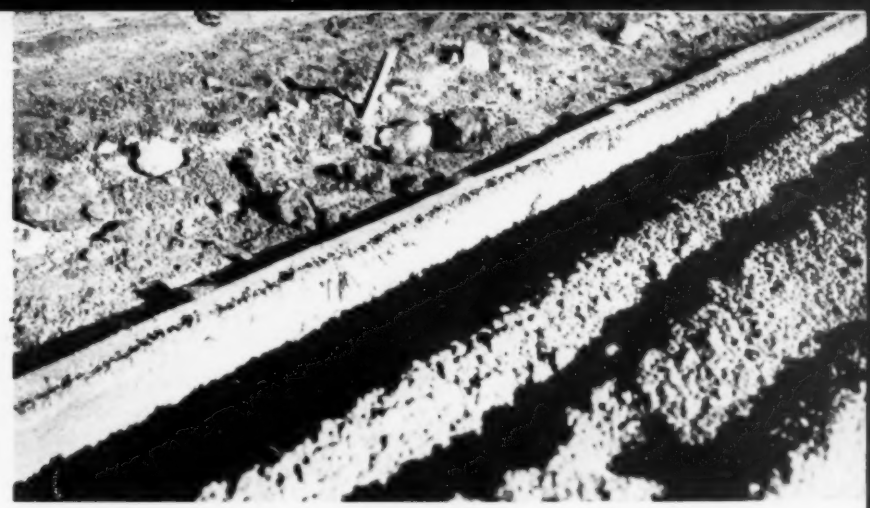
15 **BEHIND SHEEPSFOOT ROLLERS,** spring-tooth cultivator operates during preliminary compaction to prevent rollers from packing out too fast and forming crust over surface. Cultivator teeth are raised gradually as compaction progresses. When evaporation is excessive, water is added and mixed in during this operation to assure proper moisture content for finishing.

16 **PRELIMINARY SHAPING** begins during compaction and is completed as sheepsfoot rollers walk out of compacted material. Any excess material is bladed into adjacent lanes to be utilized when those lanes are processed.

19 **NAIL DRAG (below)** mounted on pneumatic-tired wheels may be raised and lowered by two levers. Better results are possible if nails are more closely spaced.

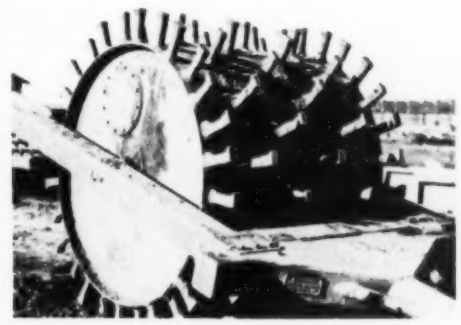
20 **AFTER PASSAGE (below)** of nail drag, homogeneous mixed material lies in loose ridges on surface of compacted chat soil-cement.

10 **DURING MIXING OPERATIONS,** auxiliary tractor-drawn plow turns material adjacent to forms to assure complete mixing. Metal shield on plow prevents material from spilling over form.



11 **CUTTING CLEANLY** against inside face of form, auxiliary plow throws material where it can be reached by rotary tillers and field cultivators used for mixing.

13 **AFTER WET MIXING** has been completed, material is loosened to full depth, and sheepsfoot compaction begins. Most skillful operator is assigned to operate equipment adjacent to forms.



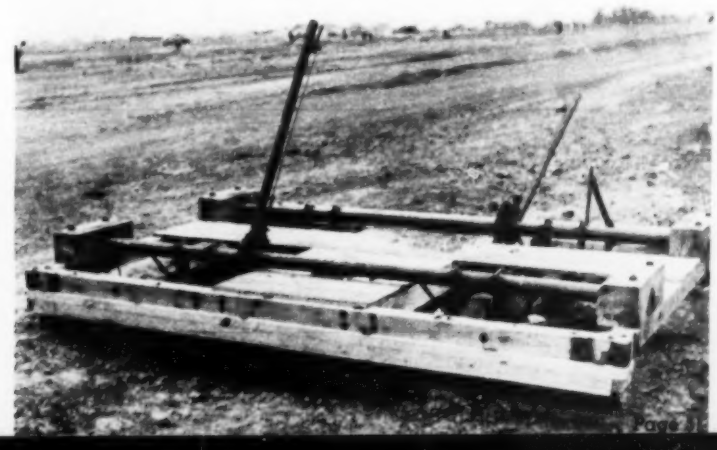
14 **SHEEPSFOOT ROLLER** having extra tamping feet in outer row gives excellent results in packing edges of 25-ft. lane.

17 **WHEN NECESSARY,** pressure distributors apply additional water ahead of final rolling operation to assure proper finishing.

18 **TO SCRATCH OUT** any compaction planes formed near surface by sheepsfoot rollers or blade machines, construction crew uses nail drag which loosens top material thoroughly before smooth rolling.

21 **TO FLATTEN RIDGES (below)** of loose mixture, broom drag goes over surface. If material contains excess moisture, as indicated here by condition which is not typical, it is mixed until evaporation removes sufficient moisture to permit proper finishing.

22 **WIRE BROOM DRAG** consists of wooden frame adjustably mounted on steel chassis equipped with pneumatic-tired wheels.

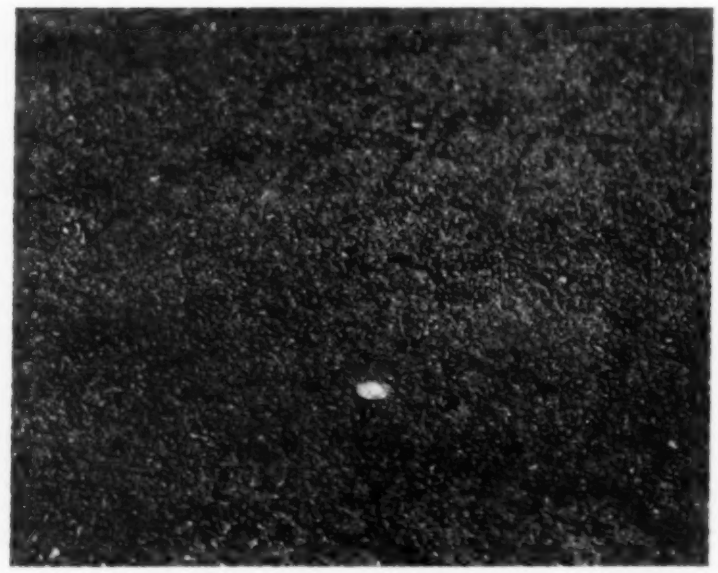


23 **INITIAL COMPACTION** on final finishing operation is obtained with pneumatic-tired roller prior to use of smooth-wheel tandem roller.

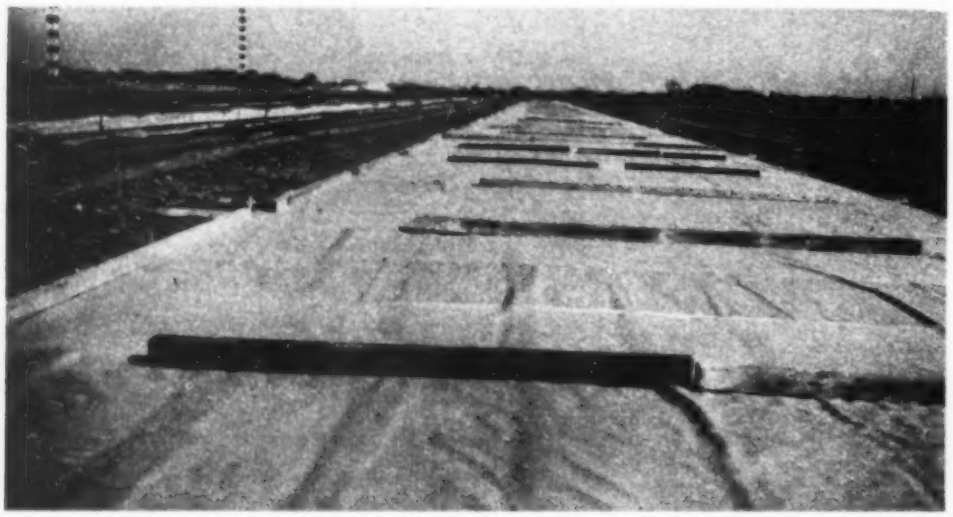
of the Portland Cement Association in Kansas City and Chicago. Before accepting the materials for this type of construction, soil technicians in the district office of the U.S. Engineer Department, which had charge of the work, made comprehensive investigations of the strength and durability of chat soil-cement for pavement use. Design and construction were directed for the U.S. Engineers by Col. H. A. Montgomery, district engineer; W. L. Kuehnle, principal engineer, and E. A. Cornell, resident engineer.

Pavement on the motor parking areas was built by the Manhattan-Long Construction Co., contractor, Tulsa, Okla. R. H. Pennartz is general superintendent of earthwork and paving for the contractor. The job was laid out by C. C. Martin and was paved under the direction of Joe Davidson, construction superintendent, and Gomer Burton, foreman in charge.

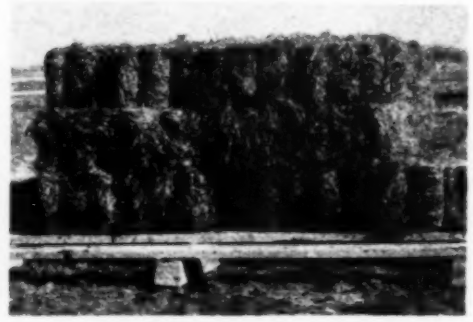
24 **TANDEM ROLLER** weighing 10 tons gives mixture smooth, dense surface. Skilled operation is necessary in guiding roller adjacent to forms at edges of lane.



25 **SURFACE TEXTURE,** indicated by comparison with coin in foreground, results from rolling with tandem 10-ton smooth-wheel machine. Tighter, more closely knit surface may be obtained by applying additional water and compacting with pneumatic-tired rollers after use of tandem roller.



26 **WATERPROOF PAPER** covering completed lane prevents loss of moisture during curing and hardening period.



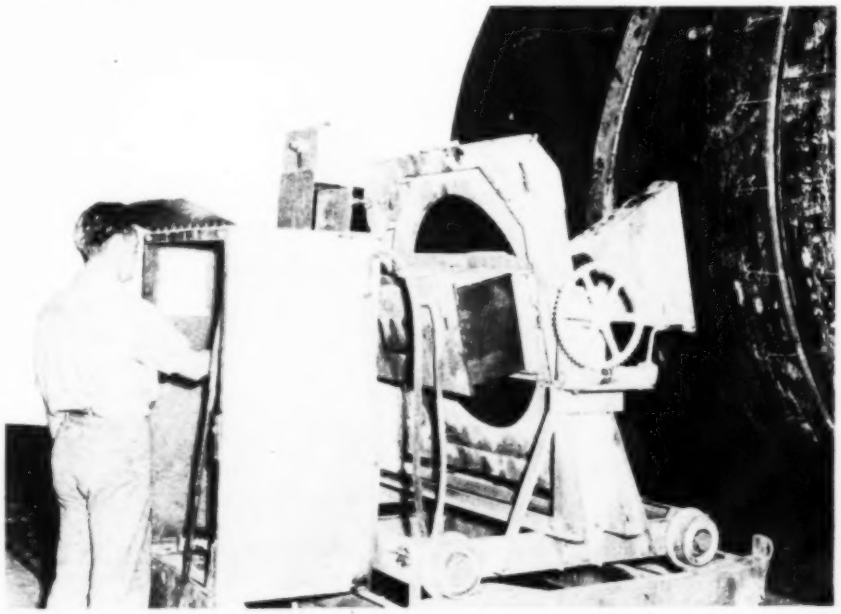
27 **FOR COLD-WEATHER PROTECTION** of chat soil-cement pavement during curing period, job is supplied with baled straw.

JOB oddities

WRECKED, BUT NOT BOMBED, is this 10-story reinforced concrete building in New York City. It was demolished to make way for cross-town approach, between 39th and 40th Sts., near 12th Ave., to second tube of Lincoln Tunnel under Hudson River between New York and New Jersey.

Wide World Photo

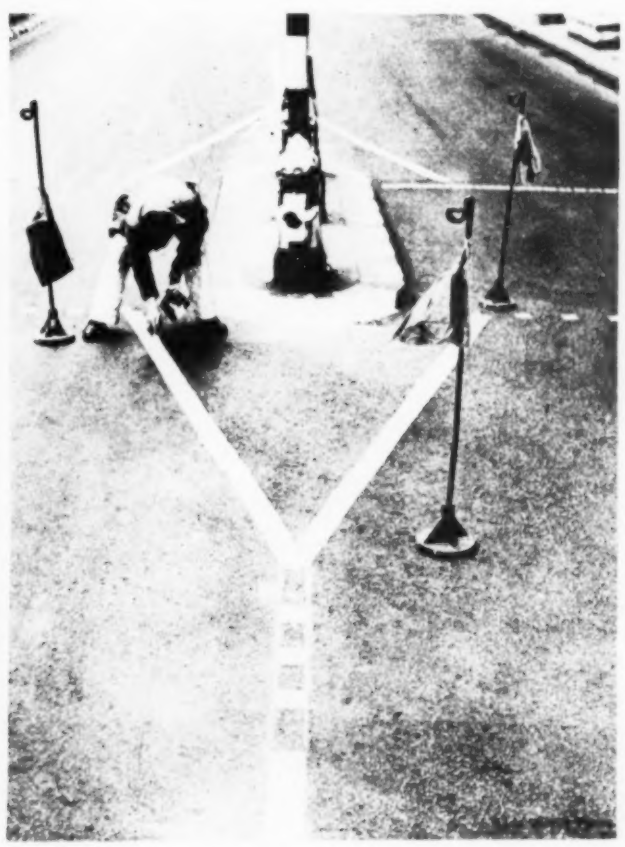
BLESSING ON DEFENSE CONSTRUCTION PROJECT is invoked when venerable Navajo Indian medicine men, in presence of Capt. Evan Johnston, constructing quartermaster, perform sacred ritual of sand painting at $10,000,000 Fort Wingate Ordnance Plant in New Mexico, dedicated Dec. 5. Sand painting is destroyed at dusk, in accordance with tribal custom.



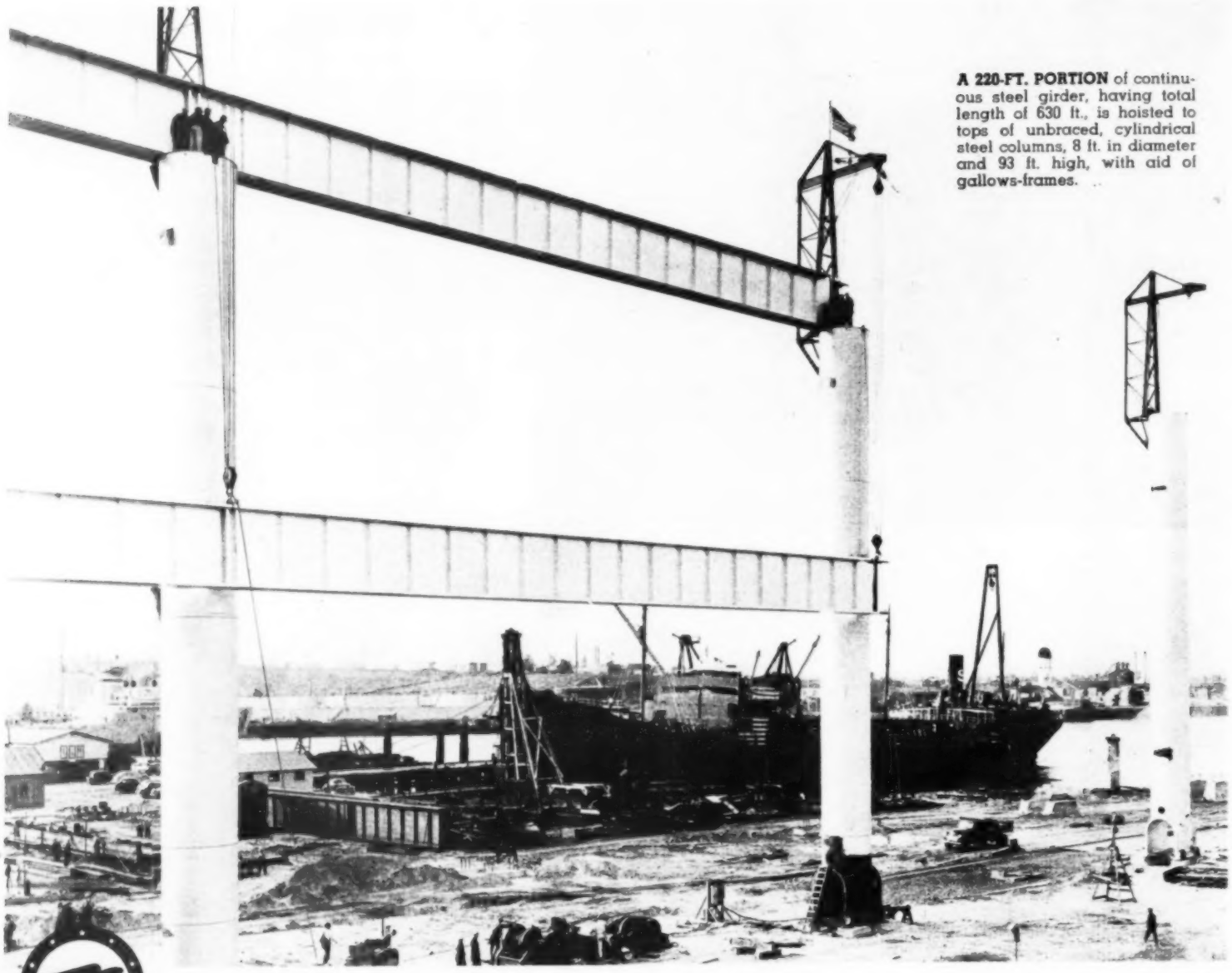
TESTED BY X-RAY MACHINE, to disclose possible flaws in welded joints, are heavy steel plate sections of penstocks for U. S. Bureau of Reclamation's Shasta Dam in California. Each pipe-section is placed on roller mounting and revolved in front of X-ray machine before acceptance for installation. Penstocks will carry water under pressure of 200 lb. per sq. in.

Photo, Texas Parade

EASY ON BACK is this labor-saving arrangement devised by gentlemen of color who uses mule to carry his hose line while sprinkling cotton curing mats on concrete paving job in East Texas.—Photo by A. C. GENTRY, district engineer, from I. H. CRUTCHER, Jr., district maintenance engineer, Tyler, Tex.



VICTORY "V" is painted on London pavement to serve as traffic guide around safety island. Note, also, that bottom of "V" is extended by straight line consisting of three dots and dash, Morse telegraphic code for V.



A 220-FT. PORTION of continuous steel girder, having total length of 630 ft., is hoisted to tops of unbraced, cylindrical steel columns, 8 ft. in diameter and 93 ft. high, with aid of gallows-frames.

IN CLOSE QUARTERS, passageways for workers between shipways are provided by cutting 6x8-ft. openings in bases of cylindrical steel columns. Openings are framed in structural shapes welded to column walls to carry craneway loads. Taking notes on test loads is PROF. R. R. MARTEL, of California Institute of Technology.

Tubular Steel Columns

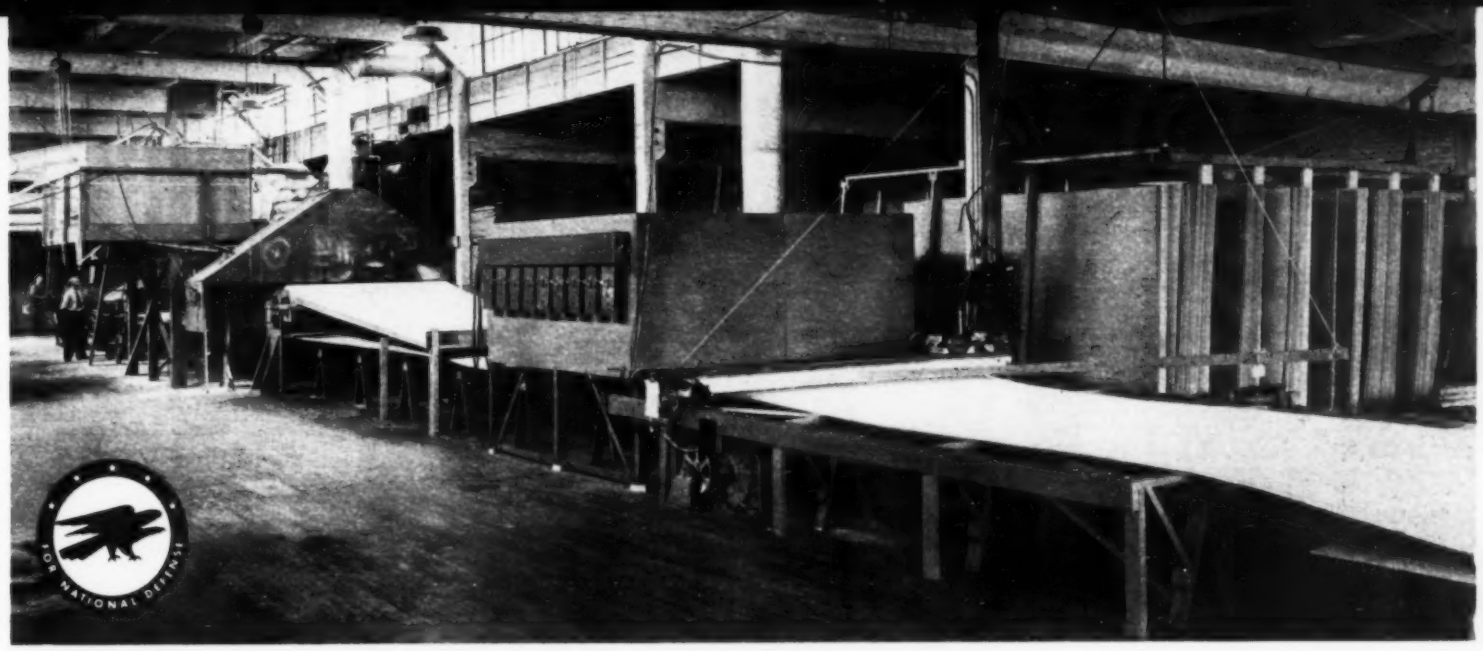
Without Bracing,

Carry Craneways at Shipyard

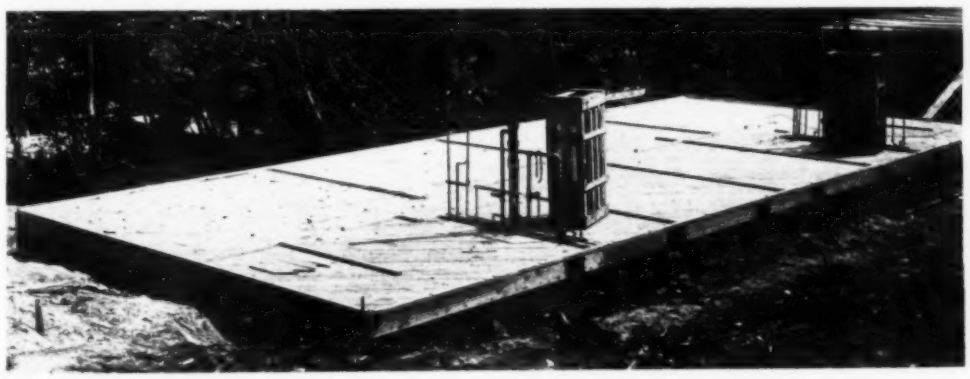
WELDED STEEL CYLINDERS 8 ft. in diameter and 93 ft. high, anchored to concrete caps on clusters of timber piles, have been erected to form columns, without braces or guys, for the support of craneways serving three shipways of a large shipbuilding and drydock company on the Pacific Coast, which holds contracts from the Navy Department. Rows of continuous steel girders 630 ft. long and 95 ft. apart support the crane rails above the group of three ways. Each line of girders is carried by six of the cylindrical steel columns, spaced 110 ft. apart, leaving a 40-ft. overhang at each end.

For the support of the columns to carry the new craneways it was decided to save cost by utilizing existing pile foundations built at the yard 25 years ago for constructing ships of lesser widths than those now building. The necessity of providing greater width in the three new shipways

(Continued on page 130)



ASSEMBLY LINE in manufacturing plant produces plywood of two types for defense housing project. One type is fabric-covered for interior use and other is bare for exterior use.



COMPLETED FLOOR of housing unit is ready for erection of prefabricated walls and partitions.

Defense Housing

Uses Wall Panels of Prefabricated Plywood

PREFABRICATED PANELS of plywood are set in place to form walls of houses.

PREFABRICATED PANELS of plywood form the walls of 150 duplex buildings erected by the Speedwall Co., of Seattle, as a defense housing project at Eastpark, Bremerton, Wash. These 300 five-room housing units were completed in a period of 2 months, and walls were erected at the rate of a complete vertical setup for one house in 12 man-hours.

The first duplex building was delivered June 6, 1941, double walls, partitions and ceilings arriving at the site by truck direct from the Speedwall Co.'s plant via ferry across Puget Sound. Walls for four complete duplex buildings were shunted off the manufactur-

(Continued on page 122)

PROJECT COMPRISES (below) 150 duplex housing units of two sizes, measuring 24x64 ft. and 24x52 ft. in plan.

HOW *They Did It*

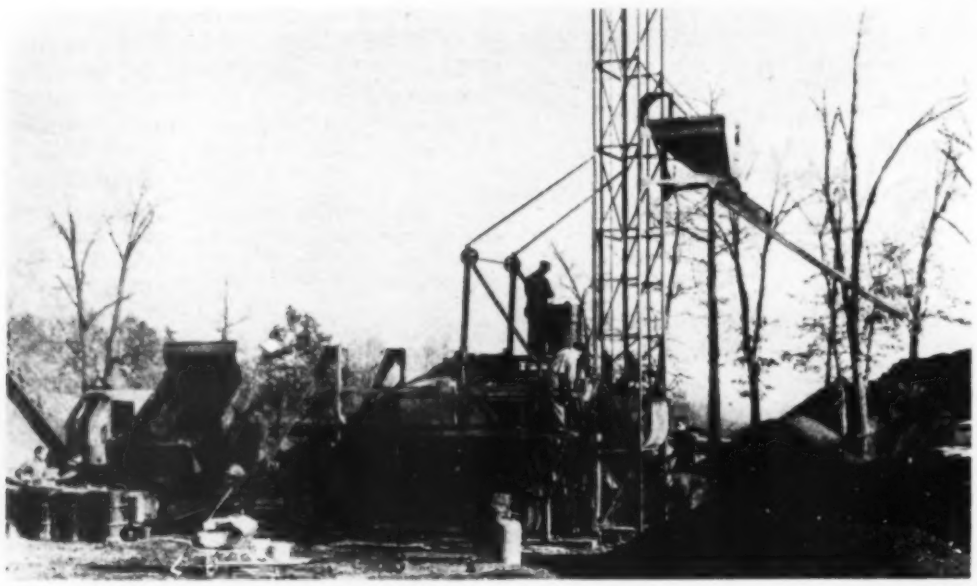
CONSTRUCTION DETAILS

For
Superintendents and Foremen

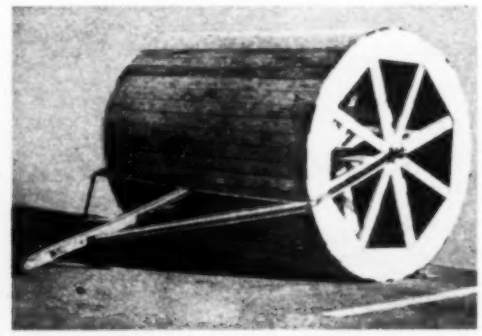
VERSATILITY of Allis-Chalmers tractor equipped with Hough bulldozer blade is illustrated by its use for lowering 10-in. welded water supply pipe line into trench on defense housing project under construction by McNeil & Zoss, of San Diego, Calif.

EARTH-BORING AUGER, operated by air from portable compressor, is used by Army Engineers to put down hole 1 ft. in diameter.

TURF AIRFIELD MAINTENANCE is aided by use of this 9-gang Worthington mower, which cuts grass on 500-acre area in 10 hr., operating at speed of 20 m.p.h.



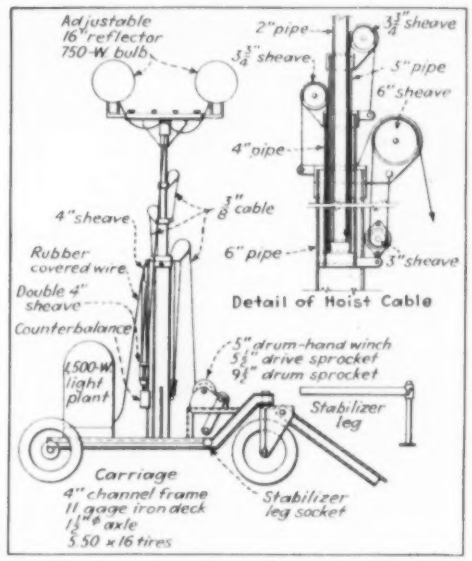
MOBILE TRUCK-MOUNTED MIXER of tower type produces cold asphalt mixture for stockpiles, using undried aggregate treated with Kotal waterproofing agent at plant of C. W. Blakeslee & Sons, Inc., contractor, of New Haven, Conn.

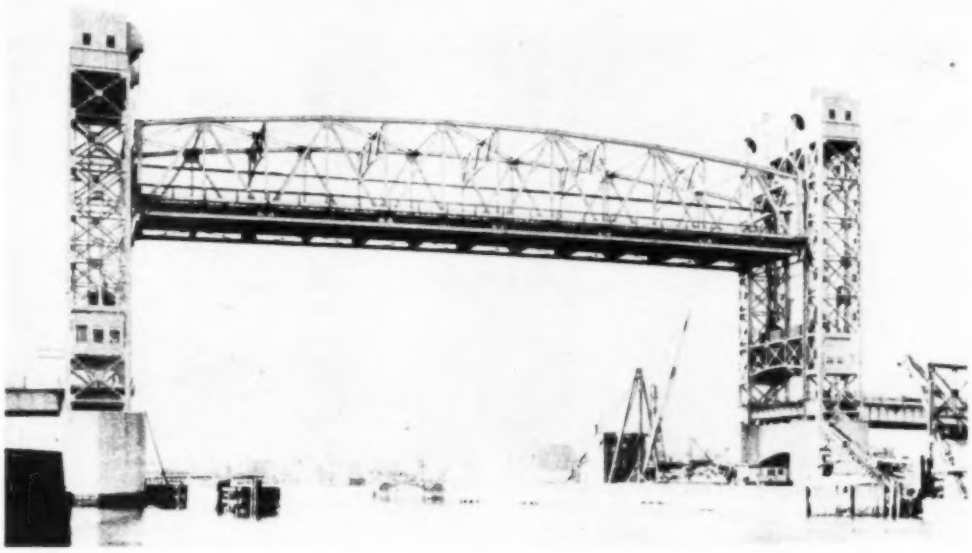


FOR PACKING SNOW on runways of Allegheny County Airport, Pittsburgh, Pa., Twing Brooks, airport manager, employs this 1,000-lb. wooden roller 8 ft. in diameter and 10 ft. long. Pulled by light truck, roller has reduced depth of snow from 6½ to 2 in. in one pass, producing firm surface free from ruts.

RESERVOIR LINING of asphaltic concrete is compacted by roller operated up and down slope by cable from tractor on top of bank. This equipment was used at new Chatsworth high line terminal reservoir by Los Angeles Department of Water and Power. Sides and floor of reservoir were covered with 4-in. layer of asphaltic concrete and then given a cement brush coating.

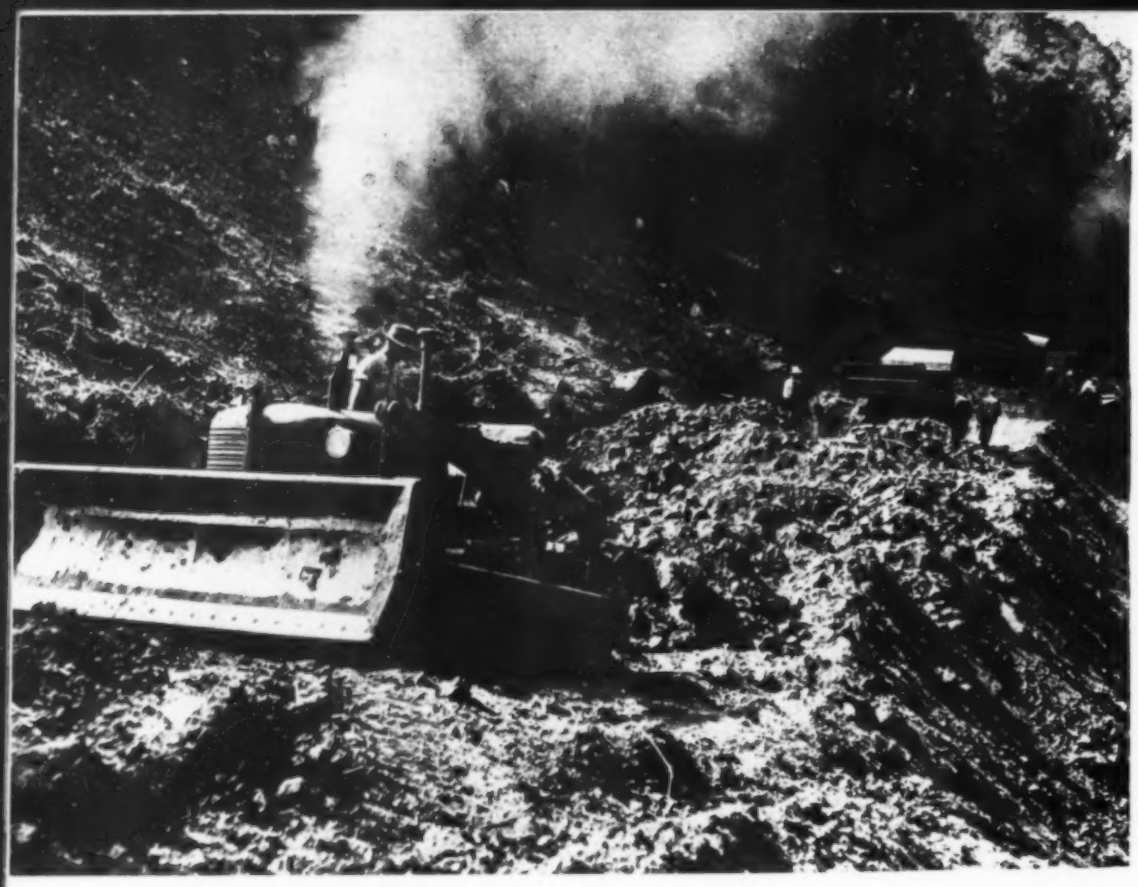
MOBILE, ADJUSTABLE LIGHT PLANT (above and below) of Western Contracting Corp., Sioux City, Iowa, is equipped with telescopic four-part mast which can be raised or lowered by hand winch to set floodlights at any desired elevation from about 8 ft. to 25 ft. above bed of carriage.





SYNCHRO-TIE DRIVE, new method of control developed by Westinghouse, keeps two ends of lift bridge across Passaic River in New Jersey rising evenly and eliminates use of excessive current at instant of starting. Each end of bridge is hoisted by 200-hp. wound-rotor motor, while torque is transmitted between two ends by two 100-hp. synchro-tie motors.

DIESEL WHEEL TRACTOR (below) of new Caterpillar design, fitted with huge pneumatic-tires, works 24 hr. per day to move earth in LaPlant-Choate scraper on 10-mi. road relocation job between Franklin and Riverton, Neb., involving 426,400 cu.yd. Contractor operating two of these outfits is Gerhold & Matzen Co., of Columbus, Neb.



AT OCOEE NO. 3 DAMSITE on Tennessee River construction starts when Allis-Chalmers tractor, equipped with bulldozer blade, cuts grade for access road along hillside. Dam will be 110 ft. high and project will include 12,000-ft.-long tunnel leading to power plant above Ocoee No. 2 Dam.

AT APALACHIA DAM on Hiwassee River in North Carolina TVA workers with core-drill rig start exploration of subsurface material. Project includes dam 110 ft. high and tunnel 43,000 ft. long to carry water to downstream power plant.

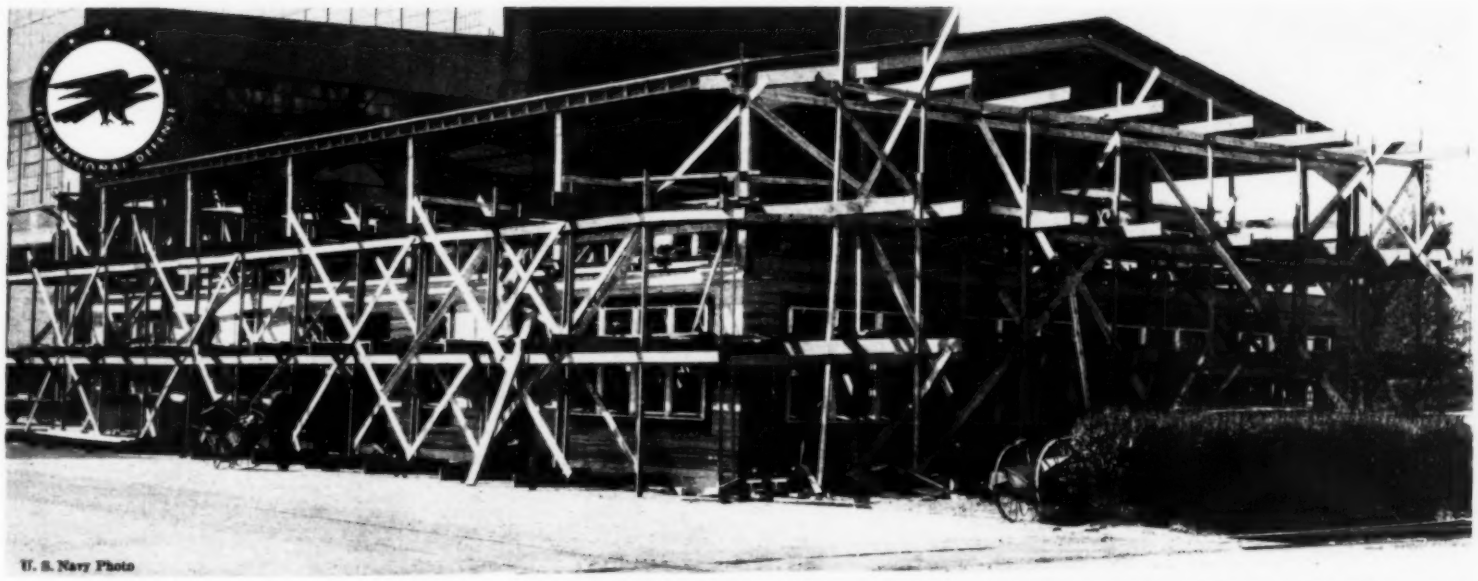
Four New Dams

Started by TVA To Develop Power for National Defense

AT NOTTELY DAM near Blairsville, in Georgia, construction crew moves in with Bucyrus-Erie power shovel. Project does not include power installation but will store water for use at other projects downstream.

AT CHATUGE DAMSITE (below) on Hiwassee River near Hayesville, N. C., core-drill is set up on line of dam axis. Earth structure 150 ft. high will not develop power but will store water for downstream projects.

TO DEVELOP POWER needed for national Defense purposes the Tennessee Valley Authority recently was authorized by Congress to construct four new dams, on which preliminary work has already begun. The dams include: Ocoee No. 3, with a height of 110 ft., on the Ocoee River in Tennessee; Chatuge, an earth dam 150 ft. high on the Hiwassee River near Hayesville, N. C.; Nottely, located in Georgia on the Nottely River, near Blairsville; and Apalachia, 110 ft. high, on Hiwassee River, below existing Hiwassee Dam in North Carolina.



U. S. Navy Photo

STEEL-FRAME CAFETERIA BUILDING to supplement existing food dispensing facilities at Navy Yard has secondary wall framing of wood studs to which horizontal sheathing lumber is nailed.

Tied, Welded A-Frames

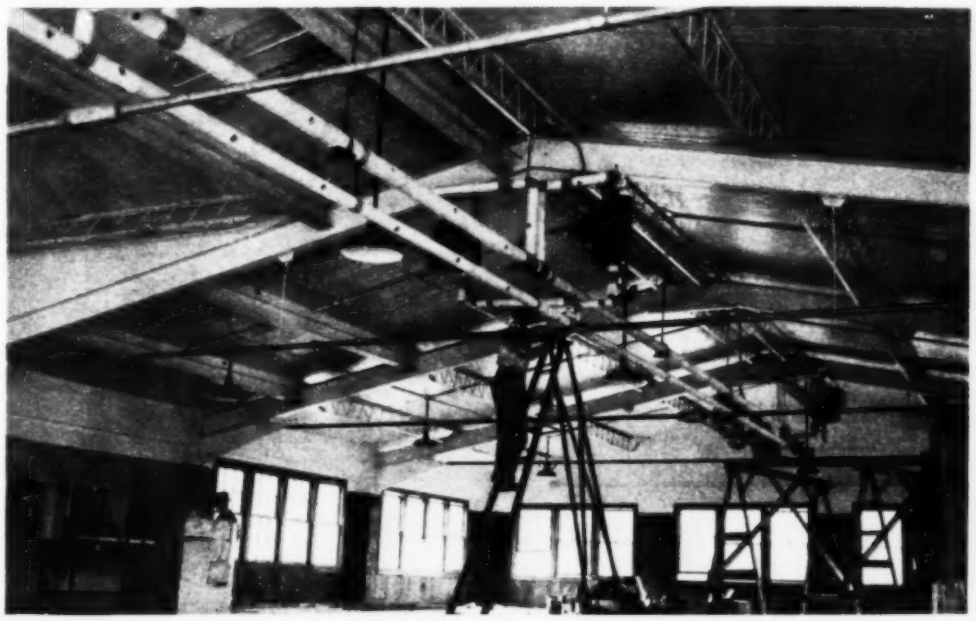
SUPPORT 54-FT. ROOF SPAN

WELDED AT THE PEAK and tied between haunch gussets by turnbuckle rods, steel A-frames prefabricated and shipped intact to the site support a 54-ft. roof span over the second-story dining hall of a steel-frame cafeteria building erected by the Rust Engineering Co., Pittsburgh, for the Bureau of Yards and Docks of the Navy Department at the Norfolk Navy Yard, Portsmouth, Va. Truscon welded open-web bar joists used as purlins complete the roof frame.

Walls and roof are covered on the outside with cement-asbestos shingles laid over building paper or roofing felt on wood sheathing. In the interior, the walls are finished to a height of 7 ft. with natural plywood given two coats of Rez, a soy bean varnish. Above this wainscot, the interior walls and the first-story ceiling are surfaced with plywood, painted.

A two-pipe steam system supplies heat to Trane unit heaters in the building. Concrete stair treads are made nonslip with a coat of green Metalicron containing Alundum crystalline alumina floated into the fresh concrete.

PLYWOOD JOINTS of first-story ceiling are sanded with Black & Decker electric buffer and Carborundum Co. sanding disk by workmen wearing twin-cartridge respirators and goggles as protection against paint dust.



WELDED ROOF FRAMES fitted with turnbuckle tierods span second-story dining hall 54 ft. wide. Wainscoat of natural plywood receives two coats of soy bean varnish.

GRITTY SURFACE to prevent slipping on stair treads is obtained by floating metallic hardener containing crystalline aggregate into concrete.

Fig. 1 . . . **NATURAL SOIL** at site of airport is heavy adobe, giving high bearing strength when dry but unstable and of very low bearing strength when wet. This picture of graded and sprinkled sub-base indicates high shrinkage factor. Blanket of selected base material of thickness sufficient to spread surface loads was required so that pavement could safely support planes without deformation.

Fig. 2 . . . **WELL-GRADED MATERIAL** was available in nearby deposit whence dump trucks hauled material to grizzly that scalped off oversize rock.

MAKING *Asphalt-Surfaced Airport Runways* BY ROAD-MIX PROCESS

Fig. 3 . . . **SELECTED BASE MATERIAL** is spread over natural soil from moving dump-trucks in amount sufficient to provide, in addition to necessary base, 4-in. thickness to be treated with oil by road-mix methods.

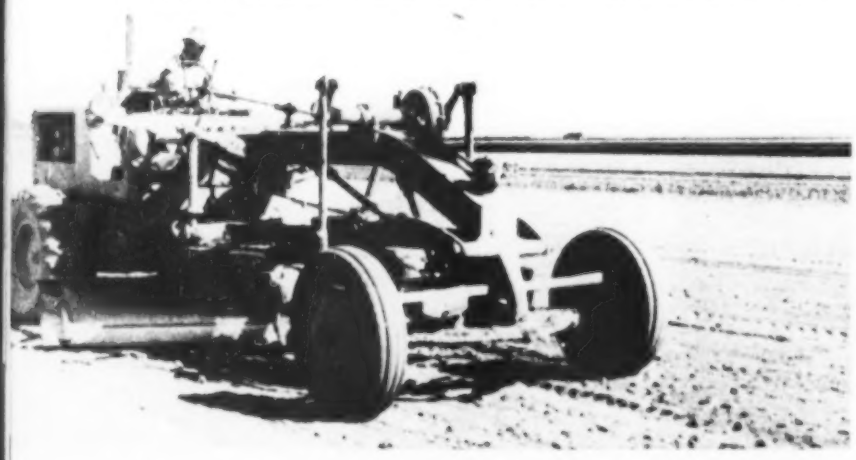


Fig. 4 . . . **SELECTED MATERIAL** is smoothed off to established gradient by Austin-Western motor patrol grader.

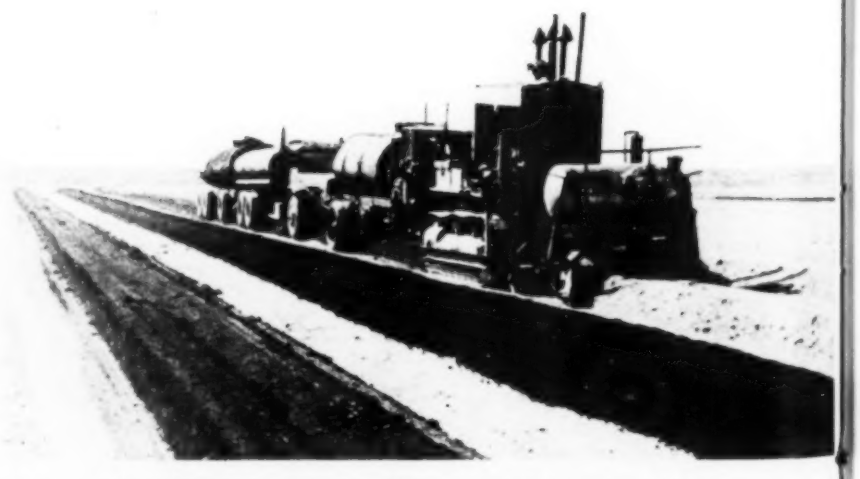
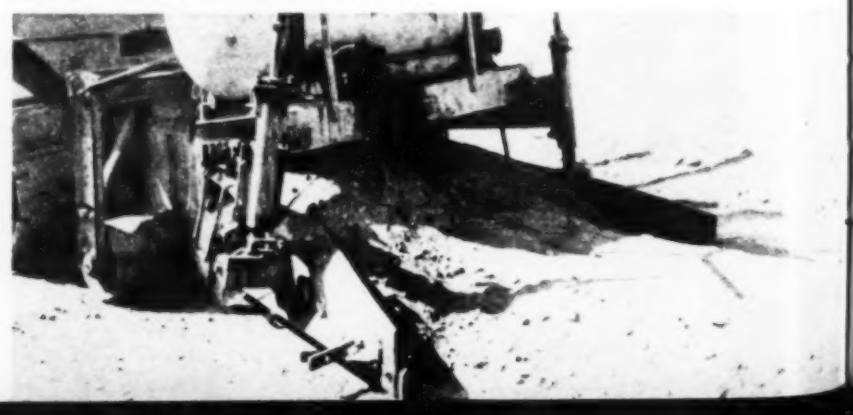


Fig. 6 . . . **ROAD-MIX UNIT** supplied by Madsen Iron Works moves along untreated windrow and incorporates required quantity of asphaltic binder (MC-3) into surfacing material.

Fig. 5 . . . **AFTER BEING BROUGHT TO GRADE, (below)** upper 4 in. is carefully scraped up into windrows in preparation for road-mixing operation.

Fig. 7 . . . **INTAKE END (below)** of road-mix equipment is shown at close range as it picks up windrowed aggregate.



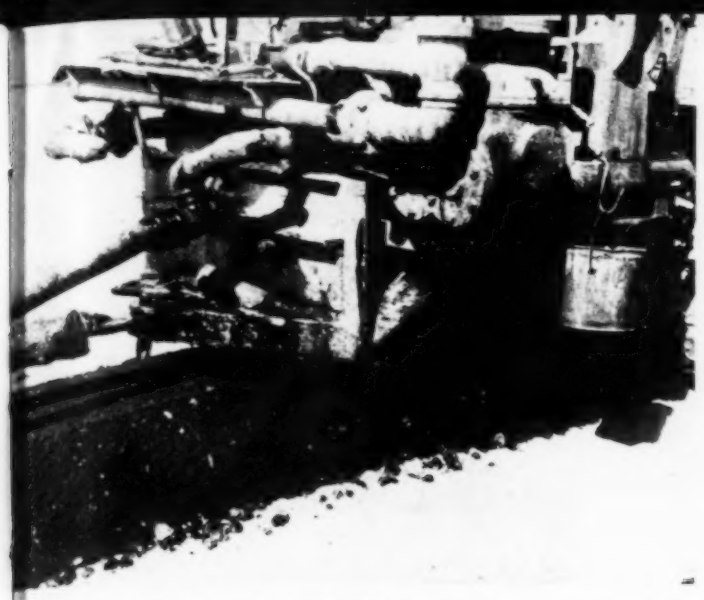


Fig. 8 . . . **AT REAR END** of road-mix equipment, asphalt treated surfacing material is deposited again in windrow. This equipment, designed to complete mix in one pass, progresses at relatively low speed, governed by grading and mixing characteristics of aggregate. Asphaltic binder used is fed into mix from tanks drawn behind mixer proper.

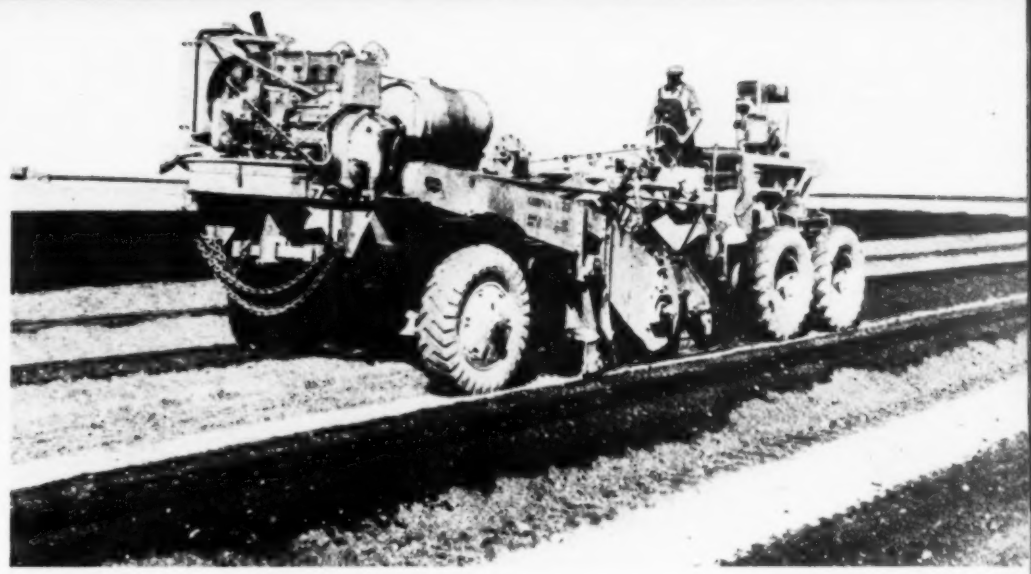


Fig. 9 . . . **ANOTHER TYPE OF MIXER,** made by Gardner Mfg. Co., has self-contained motive power, high speed and high degree of maneuverability. Because aggregate passes quickly through this mixer, several trips (usually five) are required over each windrow. Greater speed, however, is said to more than make up for time required for repeated passes.

PROVIDING AIRPORT FACILITIES, particularly the landing and take-off runways, is engrossing the attention of so many communities and is creating such demand for construction equipment suited to this work—not to mention the demand for men who know how to operate such equipment effectively—that a rather typical airport runway job constructed "somewhere in the United States" by the Navy Department is here described pictorially. On this particular job foundation conditions were none too favorable; considerable base material or ballast had to be put down before the surfacing itself could safely be constructed. Foundation conditions may vary widely, but the surfacing proper is a fairly well standardized operation, and the type of 4-in. treatment here illustrated, is commonly estimated at about 50c. per sq.yd., exclusive of work done in preparing the foundation.

Advance laboratory tests on the materials, both as to grading and stability of mixed samples, indicated that 6 to 7 percent of asphaltic binder would be optimum for the particular aggregate used. Asphalt of MC-3 grade was selected because of its workability and final inherent stability. For the road-mix operation machines of two different types were used, as illustrated in Figs. 6 and 9.

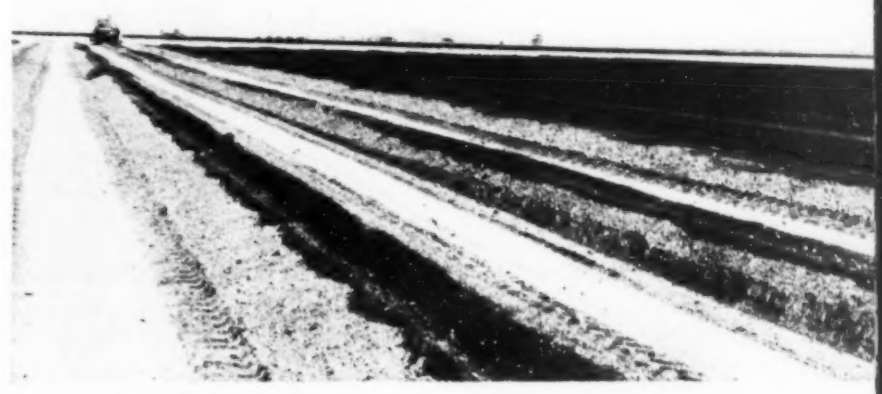


Fig. 10 . . . **WINDROWS** of partially mixed aggregate are shown in foreground awaiting another pass of Gardner mixer. In background are completed windrows.

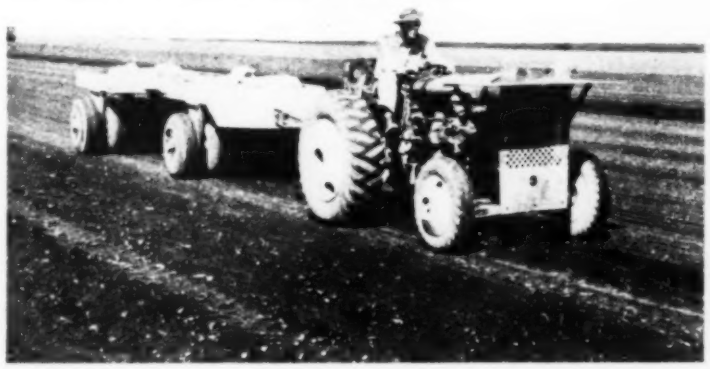


Fig. 12 . . . **AFTER SPREADING OPERATION,** which can be done by any of various forms of motor-driven blade machine, pneumatic-tired roller, loaded with sand or cement, makes repeated passes over surface to compact material from base upward, thus providing good density for full thickness of surfacing.

Fig. 11 . . . **FINISHED MIX** is here shown in windrows during period of aeration, after which oil-treated aggregate will be spread and compacted.

Fig. 13 . . . **LONGITUDINAL AND DIAGONAL ROLLING (below)** with a 8-ton tandem roller produces a well-compacted and even surface of extremely smooth riding qualities.

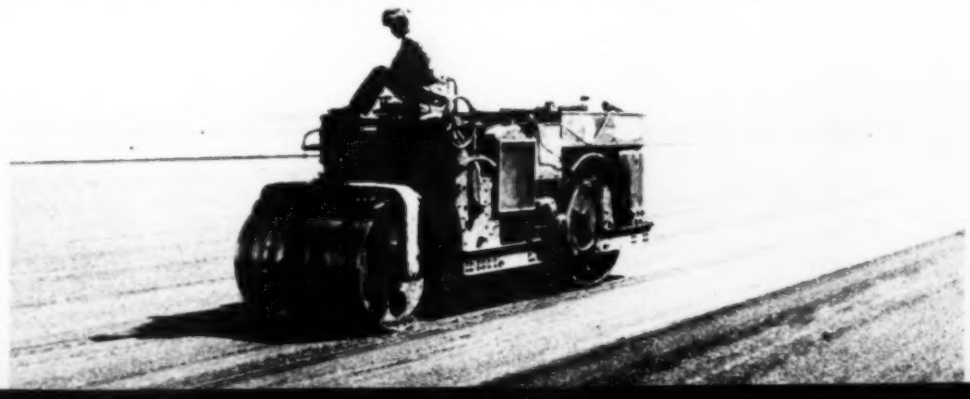


Fig. 14 . . . **CLOSE-UP (below)** shows texture of surface prior to application of heavy asphaltic seal coat which will receive final covering of sand sprinkled on lightly as cover coat.

MUCKING RIG of slusher-bucket type used to load blasted rock in 6½x 7½-ft. pioneer bores. Main elements of outfit designed by Ed. H. Honnen are: (1) Cable to hoist at portal to haul out loaded cars. (2) Two 12-cu.yd. load cars. (3) Swinging doors on cars for side dumping. (4) Two-drum electric hoist. (5) Drag cable for loading. (6) Haul-back cable for pulling slusher bucket back to muck pile. (7) Slusher bucket. (8) Sheave on hook anchored in rock face. (9) Hinged loading apron, which is raised when cars are hauled out of tunnel.

Highway Tunnels

Driven With Aid of Pioneer Bores Mucked by *Slusher Bucket Rig*

TWO 32-FT. DIAMETER ROCK TUNNELS, one 726 ft. and the other 1,037 ft. in length, form an integral part of the Clear Creek highway, a 14-mi. scenic route between Golden and a point of intersection with Highway 40 near Idaho Springs, Colo. Muck from the tunnels is used in constructing the roadway between the portals of the two bores.

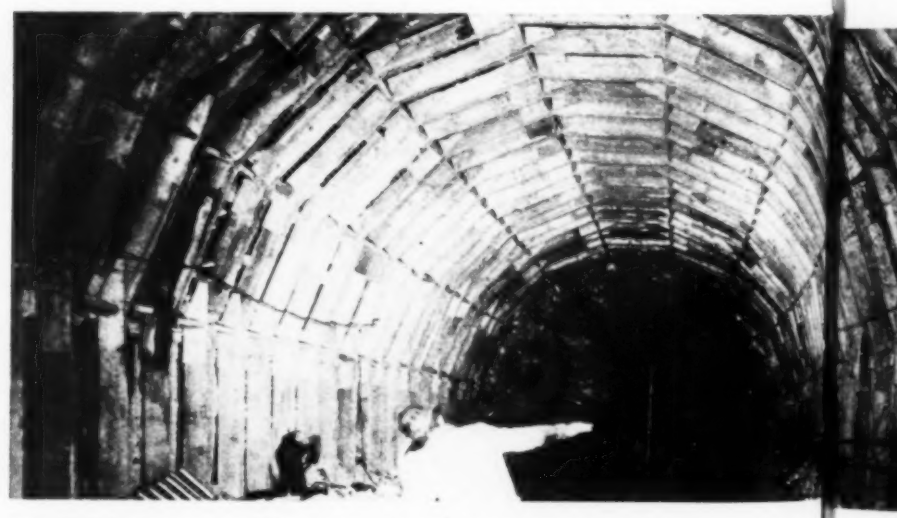
Under the supervision of the Colorado State Highway Department, with Ed. Dauchy in charge as resident engineer, the tunnels were driven through granite of varying degrees of hardness by the Ed. H. Honnen Construction Co., of Colorado Springs, using 6½x7½-ft. pioneer bores drilled from column and bar setups. These pioneer bores were completed before the full tunnel sections were drilled and blasted in order to provide effective ventilation. Drilling of the face of the full tunnel section, however, was done from a jumbo carrying six Gardner-Denver drifting drills using drill steel fitted with Ingersoll-Rand detachable jackbits.

Methods and equipment employed by the contractor are illustrated in the accompanying photographs. The drill jum-

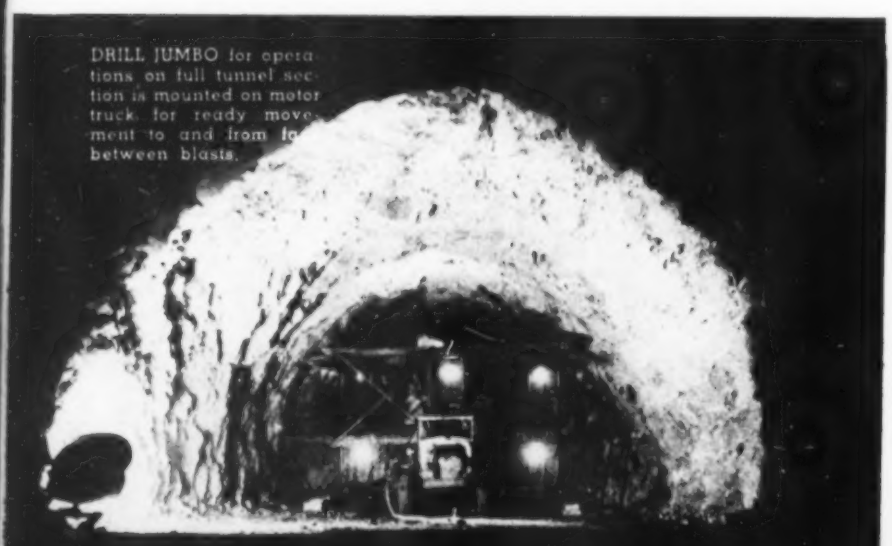
(Continued on page 126)

Photos, Thos. J. Barbre

MUCKING in full face section of tunnel is done with ¾-yd. Lima power shovel, equipped with short boom, loading into 3½-cu.yd. Dumptor truck

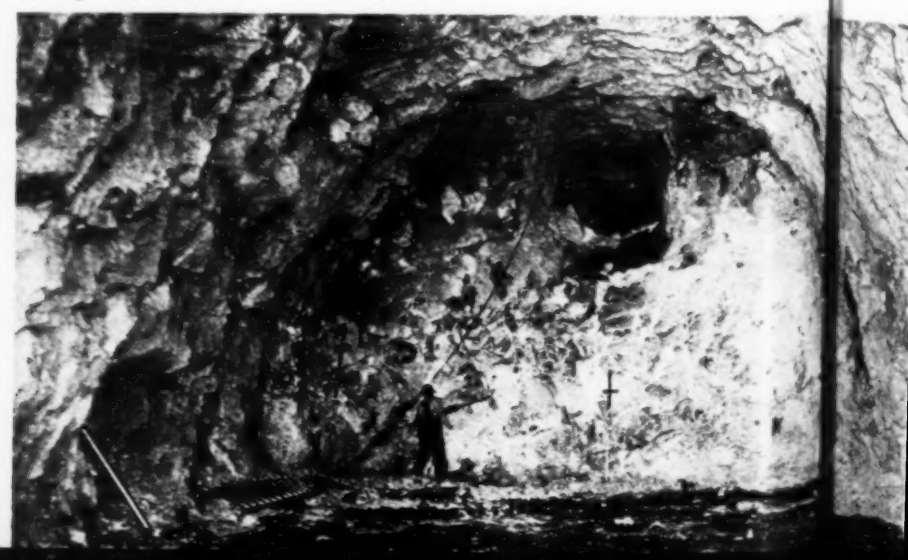


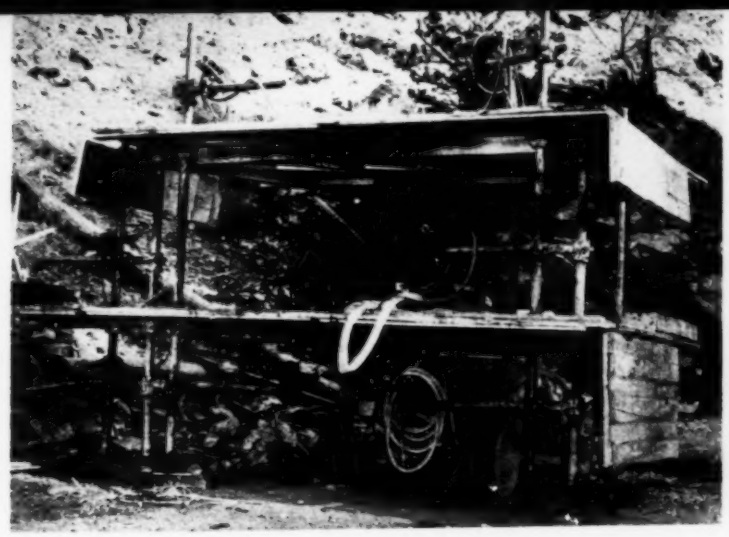
TIMBERING is placed in 300-ft. length of tunnel. Support consists of seven-segment arches and wall plates of 12x12's set on 5-ft. centers.



DRILL JUMBO for operations on full tunnel section is mounted on motor truck for ready movement to and from face between blasts.

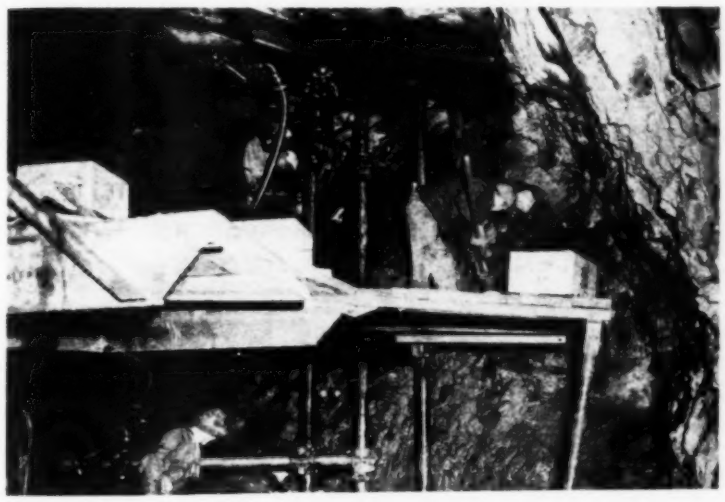
FULL SECTION (below) of tunnel 32 ft. in diameter, showing, at top, 6½x 7½-ft. pioneer bore to provide ventilation. Worker is scaling face prior to drilling next round.

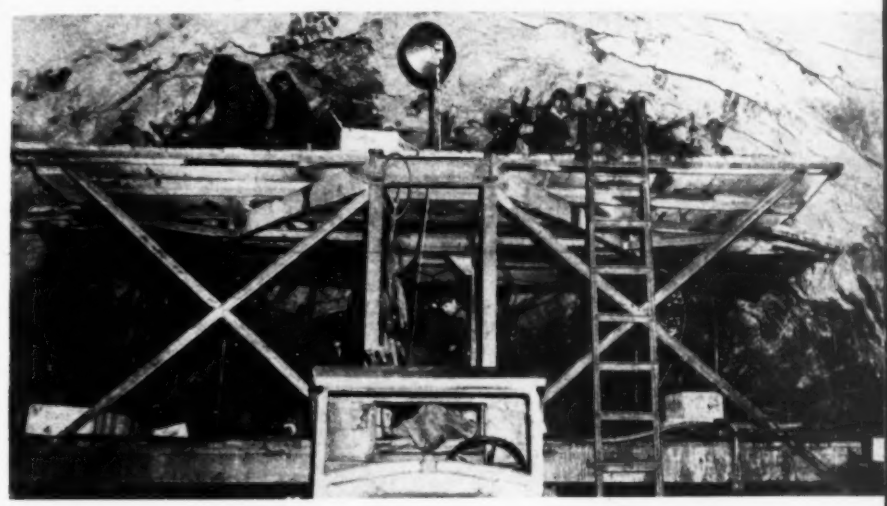




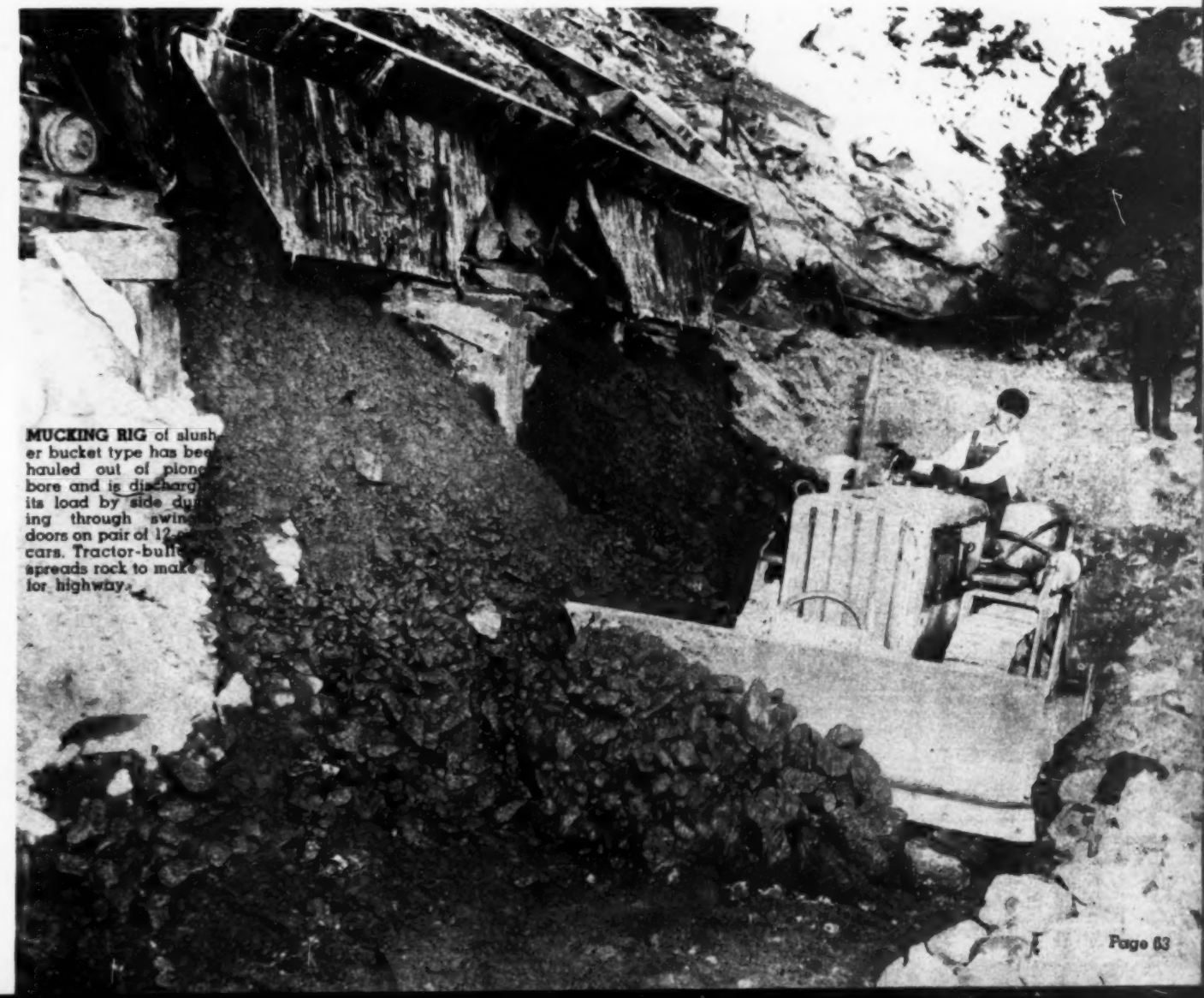
FOR CARRYING SIX DRILLS jumbo mounted on motor truck for movement to and from face has platforms at two levels. Hinged extensions are folded down to provide side clearance during transit.

PIONEER BORES of 6½x7½-ft. cross-section are driven full length of each tunnel before full section is started, in order to provide ventilation. Drilled and loaded face of pioneer bore is being wired for shooting.





FOR LOADING HOLES drilled in tunnel face jumbo has platforms at two levels to accommodate workers. At left, men are working at lower level and at right loading is being done from upper level.

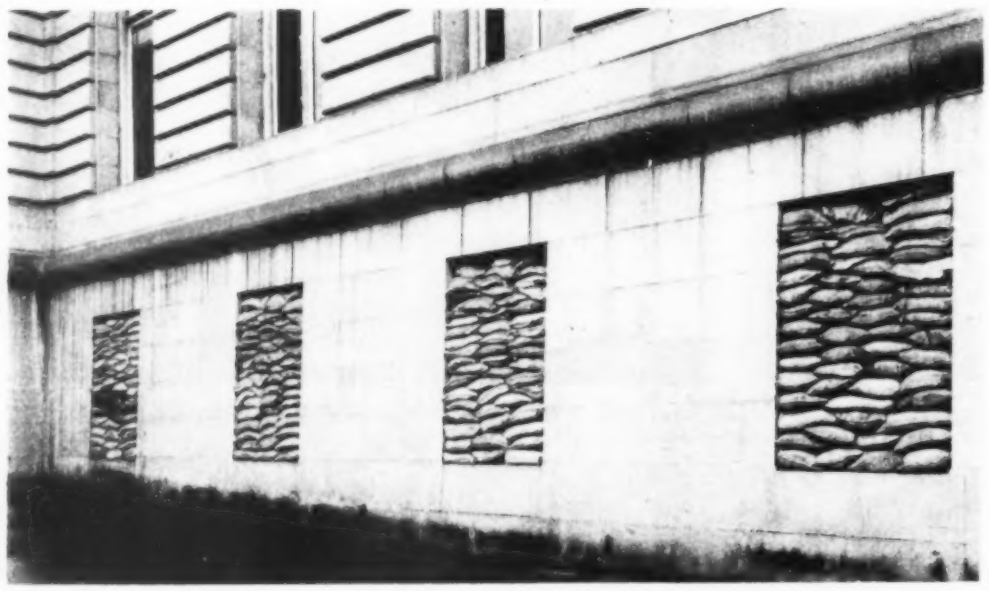


MUCKING RIG of slush
er bucket type has bee
hauled out of plon
bore and is discharg
its load by side du
ing through swin
doors on pair of 12-
cars. Tractor-bull
spreads rock to mak
for highway.

AFTER COOLING, mix sets up hard enough to retain shape without aid of burlap cover.

Anti-Bombing Barricades

Made of Bagged Sand-Asphalt Mix To Increase Durability



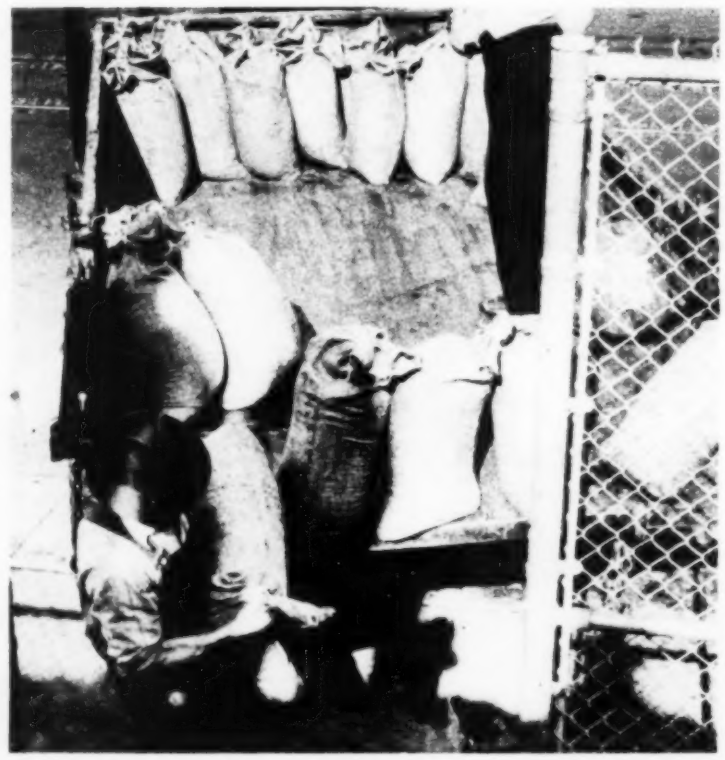
WINDOWS NEAR STREET LEVEL are barricaded by bags of sand-asphalt mix.

WHEN THE PACIFIC COAST became a theatre of war following the Japanese attack on Pearl Harbor and the sinking of ships just outside of the Golden Gate by enemy submarines the war was brought home to Pacific Coast cities. Blackouts came into vogue, civilian defense measures were studied carefully and city officials worked out plans for safeguarding important centers from possible damage by bombing. In any such situation the well-known sandbag barricade would naturally be of major importance; no other inexpensive method can be so quickly and so readily adapted to various needs.

Durability of sand bag protection was an important consideration at San Francisco because it was believed that barricades would be needed longer than the relatively few weeks or months that burlap could be expected to retain its

(Continued on page 120)

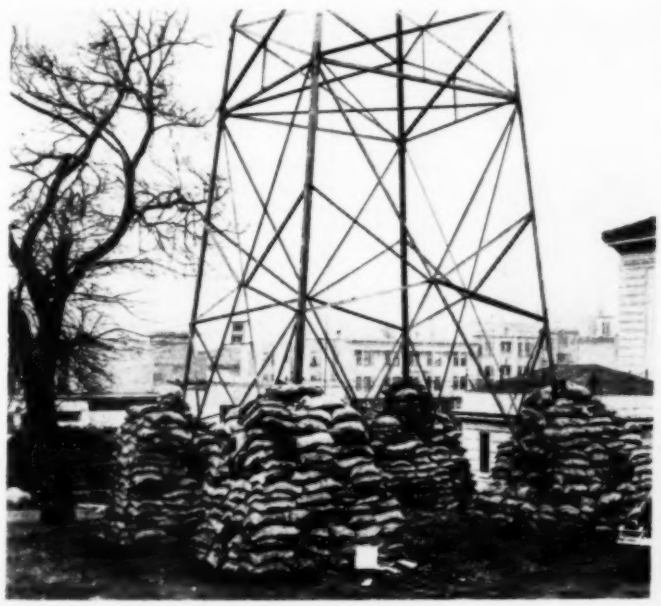
FILLING OF SACKS with sand-asphalt mix is done from hopper below pug mill at paving materials yard. Sacks filled to 60 percent of capacity give best results.



TO FACILITATE HANDLING, sacks are stood on end when loaded on truck.

FROM PLATFORM sacks are lifted to top of pile forming barricade 10 ft. high. To stabilize pile, men on top tramp down each sack while contents is still plastic.

FOR SUPPORT of barricade on earth base, asphalt footing minimizes danger of tipping as result of settlement.



RADIO TOWER BASE is protected by piles of bagged asphalt-cement mix, supported by asphalt footings.

TRENCH 14 FT. DEEP is cut in gravel pit by cable scraper and bridge to provide platform for loading gravel into trucks.

Cable Scraper

Loads Trucks From Bridge Over Trench

WHEN IT WAS FOUND that a delay of 78 days would be incurred in obtaining the necessary spare parts to repair a power shovel that had broken down, Shelby County officials in Alabama met the emergency by placing in service a 6-cu.yd. Heil cable scraper to load gravel into trucks at a local pit. In order to make this loading job feasible, a ditch about 14 ft. deep was cut into the middle of the pit, a bridge of 8x10-in. timber was built over this trench, and then a 3-ft.-square hopper was fastened into an opening in the center of the bridge so that gravel would discharge into the trucks without waste.

Under this plan the scraper picked up a load of gravel, approached the bridge and stopped directly over the hopper in unloading position. The trucks moved along in the trench and were spotted under the hopper. As soon as they were loaded they continued along the trench and out on the road to the dump. With the use of the hopper or loading trap more than 25 trucks could be loaded before the waste had to be removed from the trench. The loading trap operation with the Heil scraper permitted the hauling of 4,800 cu.yd. of gravel in 11½ days. The loading trap itself cost about $21 to construct.

FROM BRIDGE OVER TRENCH (below) gravel load of tractor-hauled scraper is discharged through hopper into truck.

Movable Canvas Tent PROTECTS LAYING - O

ON UPPER DECK of 3,588-ft.-long Pit River Bridge movable canvas cover protects concrete paving operations during rainy weather.

WITH THE AID OF A MOVABLE CANVAS TENT to protect the work during rain, delays due to inclement weather are avoided in paving with concrete the deck of the Pit River Bridge, built by the U.S. Bureau of Reclamation to relocate both railway and highway traffic across an arm of the reservoir to be formed by Shasta Dam in California. The big bridge, rising about 500 ft. above the stream for which it is named, has an overall length of 3,588 ft., including short highway approach viaducts on either side, and carries on its upper deck a 44-ft. wide, four-lane section of U. S. Highway 99 in addition to a 2½-ft.-wide sidewalk. The lower deck of the steel structure will carry two tracks of the Southern Pacific railroad.

The 44-ft.-wide bridge deck, 6½ in. thick, is paved in half-widths with concrete delivered by pipe line from a Rex Pumpcrete machine fed by a 27E Multi Foote paving mixer. After delivery into the forms, in which steel reinforcement is set, the concrete is vibrated and then surfaced by a finishing machine, followed by hand floating.

The weatherproof cover is made of canvas weighing 15 oz. per sq. yd. before treatment. It is made of 20 sections of canvas 65 ft. long and 20 ft. wide which are moved along as the work progresses. Each section is placed with its 65-ft. length transverse to the bridge centerline and adjoining sections are overlapped 1 ft., giving each section an effective width of 19 ft. Thus the 20

PUMPED CONCRETE (below) delivered through pipe lines from mixer plant is used to pave deck successively in half-widths. As work progresses, delivery line from Rex Pumpcrete unit is shortened and when slab has been poured close to mixer, mixing plant is backed up to new position. Concrete mixer, a 27E Multi Foote paver, is elevated so that it can discharge by gravity into hopper of Pumpcrete mounted on forward end.

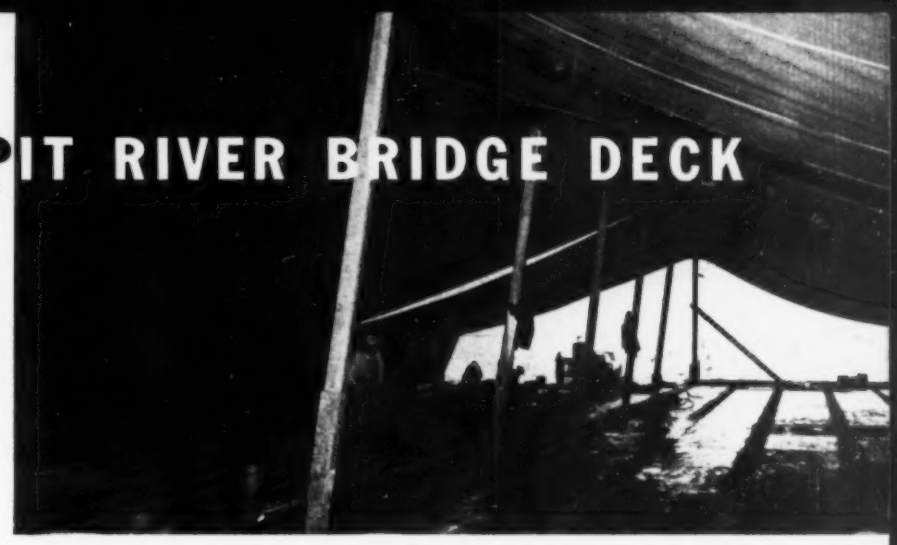
DISCHARGE END (below) of pipe line from Pumpcrete is fitted with baffle to keep pulsating discharge from spilling over hopper of delivery chute.

G OF CONCRETE PAVING ON PIT RIVER BRIDGE DECK

sections cover a 380-ft. length of the bridge deck.

The canvas is supported along the bridge centerline by a ⅝-in. wire rope whose height is maintained by 4x6-in. vertical posts 13 ft. long, set vertically under the cable 19 ft. apart. A manila rope sewn into the ridge line of the canvas has attached to it, at intervals of 6 ft. 8 in., pairs of matched hooks that

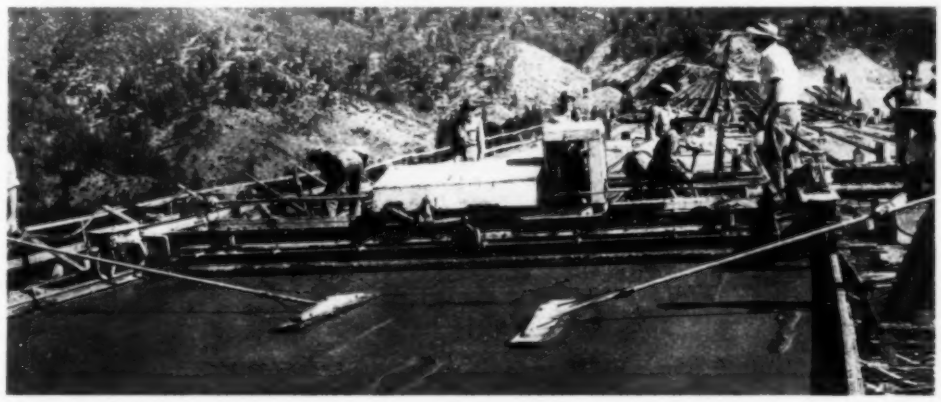
(Continued on page 128)



BENEATH CANVAS COVER (right) work proceeds irrespective of weather. Movable tent 380 ft. long is made up of 20 sections of tarpaulin, each 65 ft. long and 20 ft. wide. Ridge is formed by ⅝-in. wire rope carried at 19-ft. intervals by 4x6-in. vertical posts each 13 ft. high.

SPREADING OF CONCRETE delivered into road forms by inclined chute from pipe line is done with square-nosed D-handle shovels, after which concrete is vibrated to insure filling of spaces between steel reinforcement before pass by finishing machine.

AT EDGES OF COVER canvas passes over 2-in. pipe railing 5½ ft. above bridge deck.



FINISHING MACHINE passes over vibrated concrete surface of roadway slab and is followed by hand floating.

ON UPPER DECK (below) of span movable canvas cover permits paving during rainy weather. Below lower deck safety net is hung to protect workers from 500-ft. fall into river.

TO FASTEN DOWN ENDS (below) of canvas cover pair of double blocks is used at end of each 20-ft. section and at end of "over" ropes on 6 ft. 8-in. centers. Matched hooks at end of block and tackle insure easy removal when strain is released.

TRU-TRACTION*

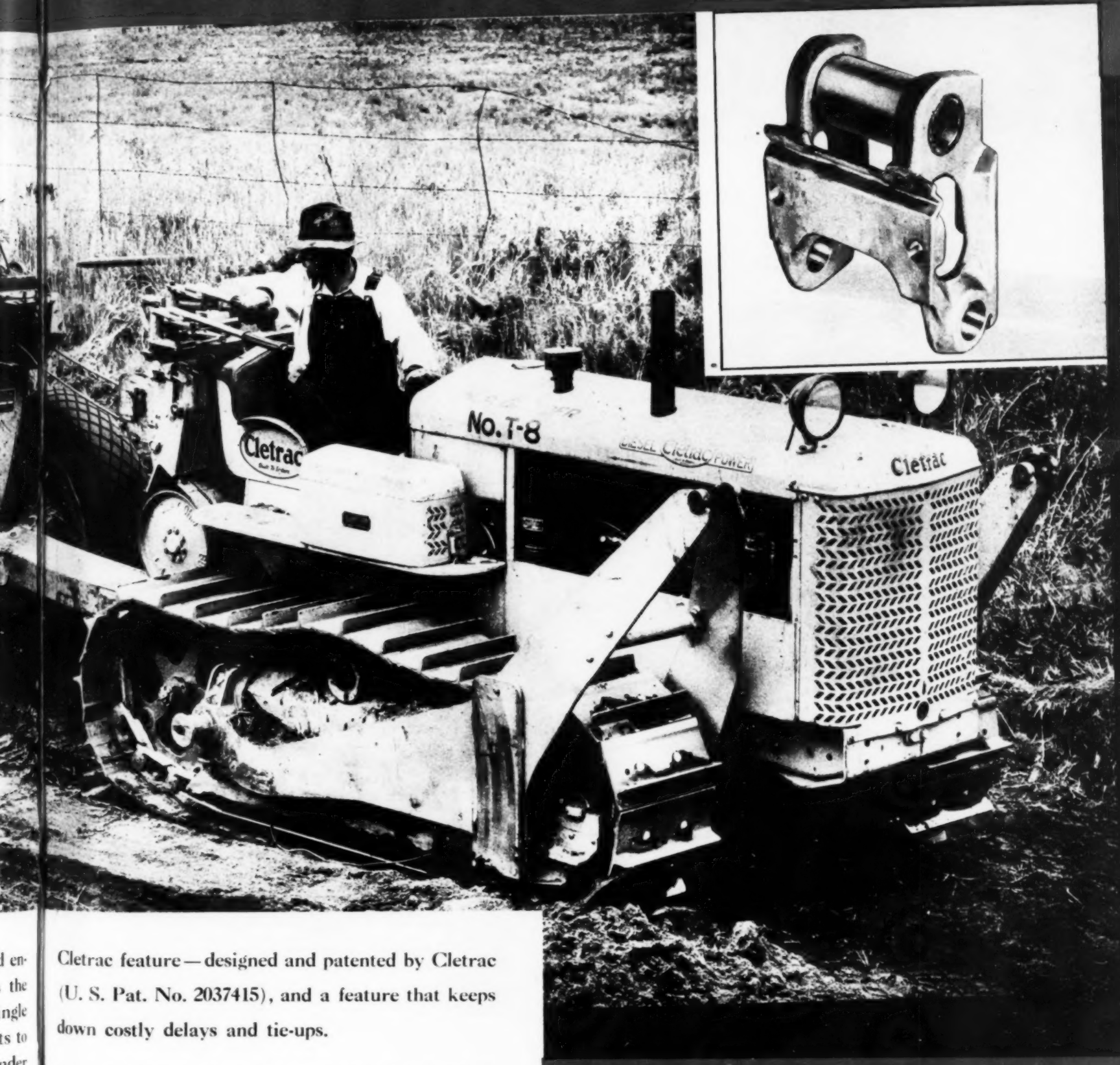
* Tru-Traction is power on both tracks at all times.

TRU-TRACTION will keep your job running under the most adverse conditions—because you have power when you need it. Working and turning on side hills—turning with a full load—operating in mud and muck—uphill and downhill—you always have power on both tracks—and you need power to do the tough jobs as well as the easy jobs.

ONE PIECE SHOE— Typical of the advanced engineering features embodied in the Cletrac is the patented one-piece track shoe—made from a single forging. There are no bolts to loosen—no rivets to shear off—nothing to come loose in the shoe under severe strains that the track encounters. The result is a longer wearing, more rigid shoe. An exclusive

Model DD Cletrac—61 Drawb H.

One Piece SHOE



Cletrac feature—designed and patented by Cletrac (U. S. Pat. No. 2037415), and a feature that keeps down costly delays and tie-ups.

THE CLEVELAND TRACTOR COMPANY
CLEVELAND, OHIO

CLETRAC CRAWLER TRACTORS

14 to 96 Horsepower
Gasoline or Diesel

H. P. Heil Cable Scraper

CLEARWATER DAMSITE, showing excavation for cutoff trench in right foreground, seepage trench in left foreground, control tower and intake for diversion tunnel in right background, and stilling basin in left background.

GROUTING OPERATIONS in progress on section of cutoff trench at Clearwater Dam.

Clearwater Dam

Is $8,000,000 Army Engineer Flood Control Project In Arkansas

CONSTRUCTION by the Little Rock, Ark. District, U. S. Army Engineers, of the outlet works of the Clearwater Dam and reservoir project on the Black River in Southeastern Missouri, was practically complete at the first of the year. The second phase of the $8,000,000 project, construction of the rolled-fill earth embankment and excavation for the spillway, was started last summer. The spillway will be constructed under a subsequent contract.

Clearwater Dam, a unit in the comprehensive flood-control program for

(Continued on page 108)

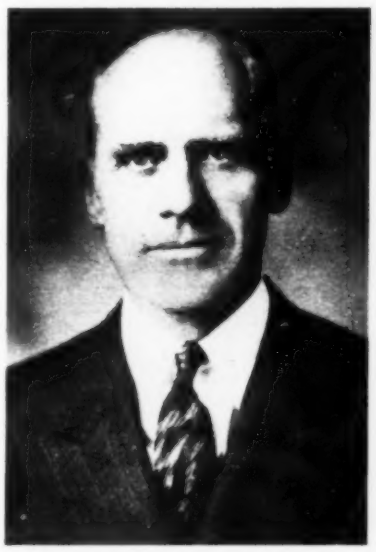
STILLING BASIN (below) is concrete structure with baffles in floor, located at outlet end of diversion tunnel.

CONTROL TOWER (below) is located at intake to diversion tunnel. At left of tower is wood falsework for service bridge.

Present and Accounted For . . . A PAGE OF PERSONALITIES

AT OFFICIAL OPENING of emergency office building completed in 38 calendar days in Washington, WALTER DISTLER (right), vice-president, George A. Fuller Co., contractor, watches W. E. REYNOLDS, commissioner, Public Buildings Administration, hand keys to WILLIAM S. KNUDSEN in presence of NEAL A. MELICK (left), PBA supervising engineer.

INDUSTRIAL PLANTS for expanded war production are guided through planning stage by ALBERT KAHN, head of busy designing and supervising firm of Albert Kahn Associated Architects & Engineers, Inc., Detroit.



KANSAS HIGHWAY WORK now is directed for State Highway Commission by ROSS C. KEELING, recently appointed chief engineer.

LEADER for this year of Chicago Ground Hog Club, composed of men connected with underground, foundation and heavy construction, is RICHARD F. KELLY, Chicago Sanitary District, recently elected president.

UNIFIED ARMY CONSTRUCTION, including former construction division, Quartermaster Corps, now functions under MAJ. GEN. THOMAS M. ROBINS, assistant to Chief of Engineers and chief of construction branch, Corps of Engineers.

HIGHWAY AND IRRIGATION PROJECTS by State of Nebraska are executed under direction of WARDNER G. SCOTT, who succeeded A. C. Tilley as state engineer and head of Department of Roads and Irrigation.

AS ASSISTANT ADMINISTRATOR, Federal Works Agency, BAIRD SNYDER III supervises FWA's centralized control over related activities in defense housing and emergency public works.

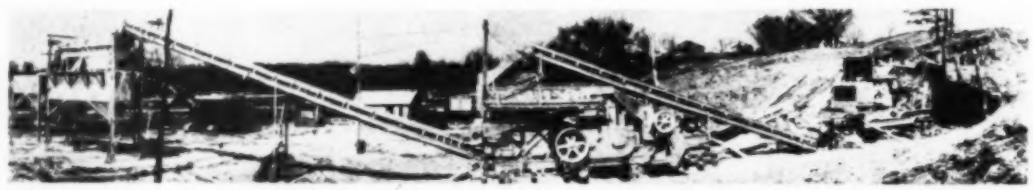
PREFABRICATED DEFENSE HOUSING by federal government is now coordinated under single direction of RUFE B. NEWMAN, JR., formerly chief of construction section of division of defense housing, Federal Works Agency.

CONSTRUCTION EQUIPMENT NEWS

Review of Construction Machinery and Materials for MARCH, 1942

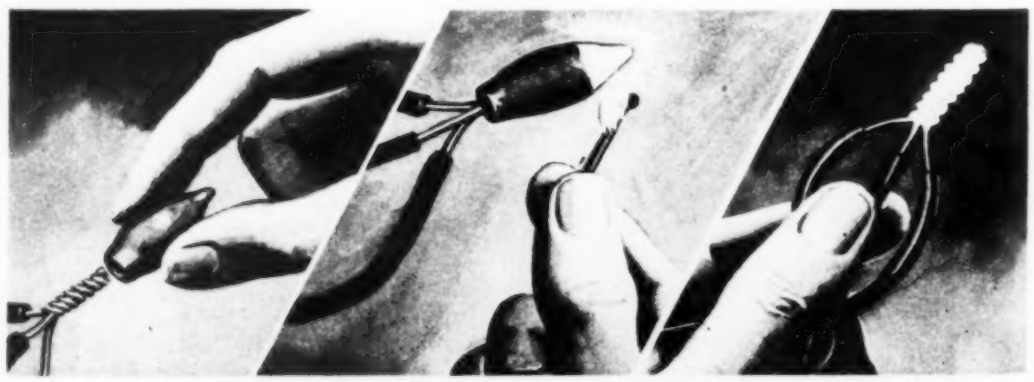
FORCE FEED LOADER for use behind motor grader, truck or tractor and also available as self-propelled unit, scoops up windrows of earth, rock or other materials from road surface behind blade of motor grader and conveys material over belt into truck which is loaded as it moves. Power is supplied by 22-hp. gasoline engine mounted on chassis. All control levers mounted on operators' platform. Loaders especially useful for cleaning up excess materials from road or street surfaces following maintenance or grading.—**Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill.**

★ ★ ★



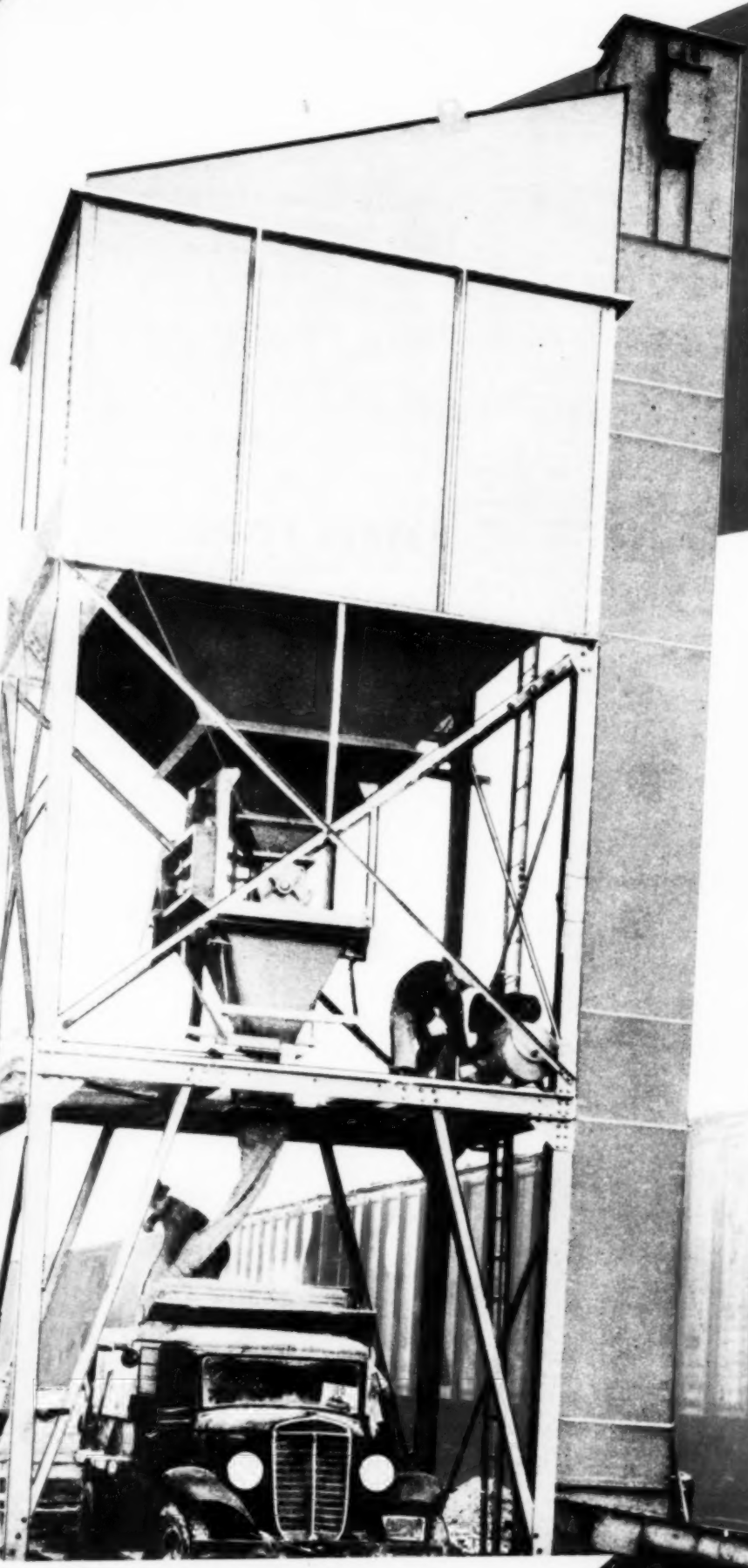
PORTABLE, SUPER-QUARRY CRUSHING PLANT, for use in construction of highways, airports, cantonments, munitions plants and other defense projects, has capacity of 150 to 200 tons per hr. and is said to produce aggregates from quarried rock to delivery trucks in one operation. Built in three major units, each mounted on pneumatic-tired truck for easy transportation and fast set-up. Primary unit with heavy-duty rock feeder and jaw crusher handles rock direct from quarry. Belt conveyor takes crushed material from primary unit to secondary plant which is equipped with roller-bearing roll crusher, secondary jaw crusher and 48-in. by 12-ft. horizontal vibrating screen. Aggregate from secondary plant is conveyed to bin unit where second 48-in. by 12-ft. screen does final grading over 40-yd. compartment bins which discharge through gates into trucks. Bin unit equipped with raising or lowering device for erecting and dismantling and steel frame truck for transporting. Plant portability, said to reduce cost of moving to job, of erecting and dismantling. Power for operation of "Morok" may be all electric or combination of diesel plus electric—**Iowa Manufacturing Co., Cedar Rapids, Iowa.**

★ ★ ★



SELF-CONTAINED SOLDERING UNIT called Jiggers for soldering electric wire splices is now available for electrical service and maintenance men, contractors and manufacturers of electrical products. Said to contain correct amount of 50-50 solder and flux to solder wire splice, hermetically sealed within waterproof, heat-generating outer shell. To obtain strong soldered connection, according to manufacturers, wire splice may be pushed into Jigger which is lighted with a match. Jigger shell ignites and produces proper temperature to flow solder into splice. Burnt shell then is dropped off, leaving smooth, soldered splice. Advantages claimed: Simple, fast, clean; no waiting for soldering iron or torch to heat up; no muss or fuss; no solder pot; no waste.—**Jiggers, Inc., 215 W. Illinois St., Chicago, Ill.**

MECHANICALLY RIGHT!



NO PIT REQUIRED

Elevator rests on ground level.

BLAW-KNOX BULK CEMENT PLANTS *are Trouble Free*

Built to keep contractors' jobs running at top speed—you get the best in bulk cement equipment from Blaw-Knox at no extra cost.

Completely portable, leak-proof and weather-proof.

A Blaw-Knox Bulk Cement Plant is ready to go to work when you get it. It's a truly portable, efficient plant which unloads, elevates, stores, accurately weighs, and loads batches of bulk cement into trucks, truck mixers, etc.

The plant comes to you complete. There's nothing else to buy and there are no complicated erection problems.

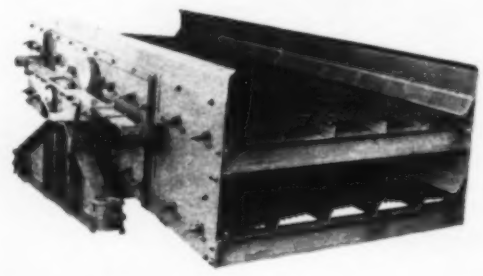
TROUBLE-FREE because: CEMENT GATE VALVES are made of machined castings, will not leak or jam—WEIGHING SCALES are precision type, show when batcher is full or empty—BIN SLOPES are steep and smooth for fast flow of cement—BEST QUALITY CONVEYORS and power drives are used. An easy plant to erect, dismantle and transport.

Blaw-Knox Bulk Cement Plants are furnished in any size (100 bbl. to 5000 bbl. or more) and with any number of compartments to accommodate different brands of cement. Either manual or automatic batchers are furnished. They are fully illustrated and described in Blaw-Knox Catalog No. 1566.

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY

NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM
Representatives in Principal Cities

VIBRATING SCREEN for sizing sand, gravel and stone has improved design features, including circle-throw central vibrator location and balanced stabilizing springs to insure uniform, positive motion, easily accessible cloth attachment bolts, positive eccentric shaft and anvil type base frame, sealed



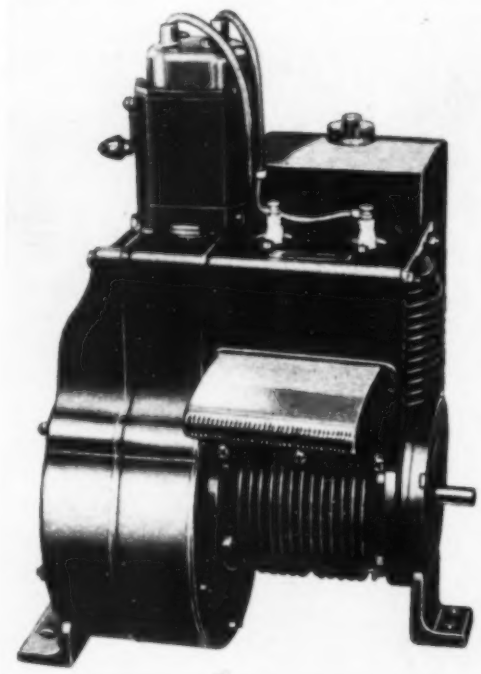
bearings, spring-tensioned cloth supported on rubber cushioned arched frame and screw-adjusted counterbalance weights for perfect balance. Under trade name of Gyrex, these screens are available in sizes ranging from 24x54 in. to 72x192 in. and with one, two or three decks. Line frame may be swung around shaft center and held in any position between horizontal and a 28-deg. inclination. Screen cloth is supported by rubber-covered bars and maintained under spring tension by easily accessible hook bolts. Eccentric portions of vibrator shaft carry extra-heavy roller bearings in dust-tight housings.—**Robins Conveying Belt Co., Passaic, N. J.**

★ ★ ★

NEW PITCH CARD identifies roofs of ¼, ⅜, ⅓, ½ and ¾ pitch. Tables contained on card said to enable user to determine many common rafter lengths immediately after width of roof and its pitch are obtained. Simple instructions for determining area of roof to be covered are given.—**United States Gypsum Co., 300 West Adams St., Chicago, Ill.**

★ ★ ★

NEW 2-CYCLE PORTABLE AIR-COOLED INDUSTRIAL ENGINES for use in powering chain saws, pumps, generator sets and compressors are available in three models: 1-cylinder, 2½-hp. engine; 2-cylinder, 5-hp. engine and 4-cylinder model for developing 10 hp. Of the 2-cycle type, engines have fewer and simpler working parts and are light in



weight for power they provide. Weight of 5-hp. model with clutch and transmission, 65 lb. Motors may be used either in vertical or horizontal position and are available complete with clutch, various gear ratios and with swivel transmission. Engines have industrial type magneto instead of fly-wheel type. Multi-cylinder models have individual cylinders as in airplane engines. Throttle or governor controlled, depending upon application. Cylinders are one-piece, aluminum alloy, diamond bored and lapped. —**Kiekhaefer Corp., Cedarburg, Wis.**

ALL-WELDED DIPPER, 1½-cu.yd. capacity, offers following features: Renewable manganese lip and dipper teeth, improvements in batching mechanism. By providing heavy shell, assuring simplicity of

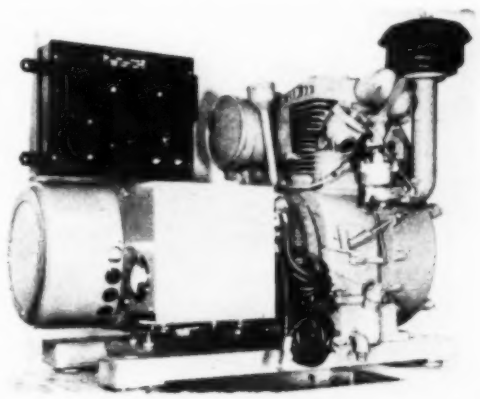
reinforcement, and sturdy padlock frame with large sheave, maximum of overall strength and rigidity is said to be obtained. Another advantage—absence of corner welds, achieved by forming dipper back of parent metal instead of inserted plate-type back. **—Harnischfeger Corp., Milwaukee, Wis.**

★ ★ ★

DEODORIZED PAINT for use in plants, stores and offices where odors from conventional paints are offensive to workers, makes paint jobs possible either in winter or summer without discomfort and is said to be completely dry in from 12 to 15 hr. Valdura No-Odor paint, as it is called, may be used on plaster, wall board, wood, cement, brick or metal and is available in flat, egg-shell or gloss finishes. Coverage is 700 sq.ft. to a gallon. Hiding power makes possible one-coat jobs in many instances. Ease of brushing said to speed application 10 to 25 per cent above conventional wall paints. May be applied with spray gun when cut with one pint of proper thinner to 1 gal. of paint. Flat and egg-shell finishes may be stippled. All finishes are washable and colors are said not to fade or dull with repeated washings. High reflectivity claimed to reduce light requirements. Colors: white, cream, ivory, buff, grey, blue and green.—**American-Marietta Co., 43 E. Ohio St., Chicago, Ill.**

★ ★ ★

110-V., A. C. LIGHT AND POWER PLANTS are available in following series: 66, 1,000, 1,500 and 2,000 watts. Generators are self-excited, single-phase type generating 110-v.; 60-cycle, a.c. 1,800 r.p.m: Double-sealed ball bearings. Bolted directly to engine crankcase. Source of d.c., 12 or 32 v., may be drawn



from d.c. terminals when plant isn't carrying full a.c. load. Powered with Briggs & Stratton 4-cycle, single-cylinder, air-cooled engine. Specially designed float-feed type, adjustable carburetor. Adjustable mechanical-type, fully inclosed, governor, running in oil. Oil-bath-type air cleaner. Overhead fuel tank, 1-gal. capacity. Gasoline filter. Pump and splash system lubrication. Available with remote control or full automatic control, if desired.—**Kato Engineering Co., Mankato, Minn.**

LIKE GALION graders and rollers, which are keeping steadily at this war-time construction, we all have a job to do individually . . . we cannot afford to let up for a minute. So keep in there pitching with everything you have and let's get this thing over with as quickly as possible. The sacrifices we will be called upon to make are comparatively small compared to those being made by the boys taking the brunt of this fighting. If we can't be with them . . . let's get behind them . . . all the way.

THE GALION IRON WORKS & MFG.

Main Office and Works: Galion, Ohio

GRADERS AND ROLLERS

ACCELERATE CONSTRUCTION

OF MORE than passing interest to Contractors is the fact that Galion road machinery has been called into action on much of this Victory construction work being speeded through to successful completion . . . is doing its bit day after day on important projects. The extra quality in Galion units is more than a match for the many extra shifts.

GALION ROAD MACHINERY
points to better roads

MFG. CO.

CHAIN SAW UNIT is designed to cut trees or piles leaving stumps 3 in. long or less. May be swiveled to cut in any direction. Equipped with saw sharpening device which may be used at job site. Available in 24-, 36- and 48-in. lengths and in models powered by compressed air, electricity or gasoline. Air-driven unit may be used under water.—**Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.**

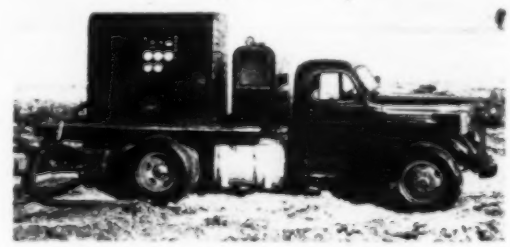
★ ★ ★

SOCKET SET contains 20 lightweight pieces made of chrome-vanadium steel in ⅜-in. square drive for making any desired combination. Includes full set of sockets with 5/16-, 3/8-, 7/16-, 1/2-, 9/16-, 5/8-, 11/16- and 3/4-in. double hexagon openings; universal joint; 6-, 12- and 17-in. extensions; ½- and

9/16-in. crowfoot attachments; 17½-in. speeder; drag link socket; 8½-in. hinge handle; 6-in. cross handle; 7-in. reversible ratchet and 8-in. sliding T. Every piece is carefully heat treated to bring out ultimate strength of steel and provided with lasting rust-resistant finish. Set is packed in metal 18x4¼x1½-in. box Weight, complete, 7½ lb.—**Bonney Forge & Tool Works, Allentown, Pa.**

★ ★ ★

AUTOMATIC, SELF-CONTAINED WATER PURIFIER, known as Sterozone has been designed for use of troops on maneuvers, but is said to have wide industrial and municipal applications. Has rated capacity up to 9,000 gal. per hour. Raw water is pumped from source through filter to remove suspended matter and then passed to an absorber chamber where ozone, generated by high frequency silent electric discharge, oxidizes bacterial contamination and delivers pure, sparkling fresh water



with no taste or odor. Sterilizing agent employed is ozone gas generated within unit itself from filtered and dried air. Power supplied from gasoline-engine-driven 10-kva., 220-v., 3-phase power plant. Unit is self-starting and self-regulating. All mechanism is driven by 5-hp., 22-v., 3-phase electric motor on which is direct mounted water supply pump and coupling. Also driven from motor shaft by V-belt are compressor, cooling water circulating pump and evaporative cooler. Ozone is generated by silent blue electric discharge between aluminum plates maintained at 13,000 v. by 2.0 kva. transformer.—**Technicraft Eng. Co., 5610 S. Soto St., Los Angeles, Calif.**

LOOKING AHEAD with LIMA

PREPARE NOW FOR *Tomorrow*

The locomotive engineer is continually on the alert, looking ahead, watching the track, guarding against anything that would interfere with meeting on-time schedules. Contractors with broad vision are also on the alert, looking ahead, far beyond today's uncertain horizons. They know that as our war efforts increase, more and more steel and other material will be going into the manufacturing of articles of war. Such a condition will affect the delivery of shovels, draglines and cranes. To meet such a situation, farseeing contractors on military construction work are investing in the best equipment they can buy; equipment that will last over a long period of time without excessive upkeep. LIMA excavators are high quality machines, built for long, continuous and profitable life. A LIMA shovel, dragline or crane will serve you best in the long run.

LIMA

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division — LIMA, OHIO

NEWARK, N. J. · NEW YORK, N. Y. · DALLAS, TEX. · MEMPHIS, TENN. · SEATTLE, WASH. · PORTLAND, ORE. · SAN FRANCISCO, CAL.
LOS ANGELES, CALIF. · SPOKANE, WASH. · PHILADELPHIA, PA. · VANCOUVER, B. C. · MONTREAL, QUEBEC, CAN.

SHOVELS - DRAGLINES - CRANES

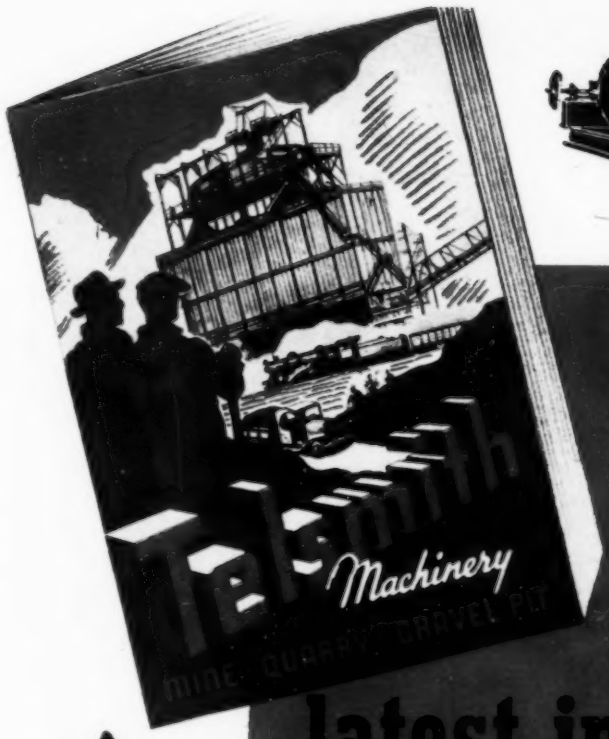
HOOK-ON VOLT AMMETER for measuring alternating current and voltage is said to enable user to read alternating current instantly on both insulated and non-insulated conductors by hooking instrument around line. For voltage readings two leads furnished with instrument are connected and thumb-manipulated selector switch is flipped to desired position on scale. Since volt-ammeter may be used on conductors of 2-in. maximum diameter, it is small enough to get into tight places, light enough

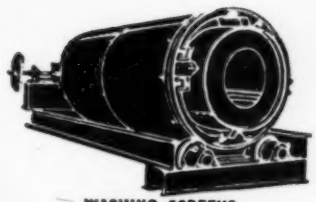
to be hung from lineman's belt and sufficiently accurate for variety of measuring jobs. Weight 3½ lb. Four current ranges, 0-15/60/150/600 amp., and two voltage ranges, 0-150/600 v., are available at setting of convenient six-position snap switch. Accuracy said to be within 3 per cent. Integral part of instrument is C-shaped, split-core current transformer which may be operated without a trigger. To make measurements, transformer is pulled open and placed against conductor. Slight push on handle snaps transformer shut. Measurement completed, gentle pull springs open dovetail joint of transformer and releases conductor. Indicating instrument is miniature rectifier unit. Readings are taken on uniformly divided scale about 2½ in. long and marked in large red and black figures corresponding to figures on selector switch. All parts mounted in single textolite case.—**General Electric Co., Schenectady, N. Y.**

★ ★ ★

AUTOMATIC BOOSTER ENGINE mounted on standard truck lessens burden of truck engine and enables unit to attain higher speeds on hilly routes and to cut down fuel consumption. Tests made with Chevrolet 1½-ton tractor unit at Berthoud Pass and Pikes Peak highway in Colorado showed savings in time, speed and fuel made possible by use of booster engine. At Berthoud Pass on 14-mi. ascent to 11,315-ft. elevation, 17-ton loaded truck effected 42

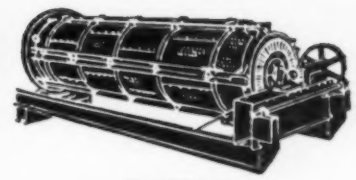
per cent saving in time, 72 per cent gain in speed and 23 per cent reduction in fuel consumption. At Pikes Peak Chevrolet made 20-mi. ascent with 13-ton load to 14,110-ft. elevation in 1 hr. 55-min., 20 sec., averaging 10.4 m.p.h. Clark automatic booster engine developing 46 hp. at 3,200 r.p.m. and 93 ft./lb. torque at 1,350 r.p.m., is installed in regular truck chassis back of cab and below level of body platform. Delivers power through truck transmission and regular drive shaft. As long as truck maintains road speed of 31 m.p.h. in high gear, booster engine does not start. When truck encounters grade which causes it to slow down with wide open throttle to 31 m.p.h. booster engine automatically starts adding its power to that of main engine to maintain cruising speed. When truck attains speed of 45 m.p.hr. booster engine automatically cuts out.—**Chevrolet Motor Co., Detroit, Mich.**



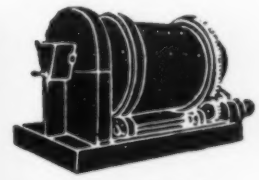


WASHING SCREENS

PULSATORS

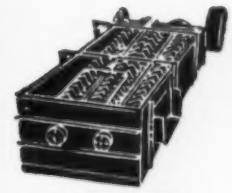


DRY SCREENS

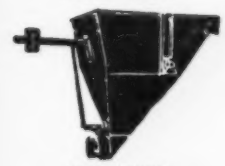


SUPER SCRUBBERS

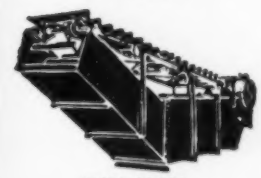
SCREW REWASHERS



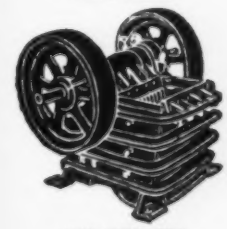
LOG WASHERS



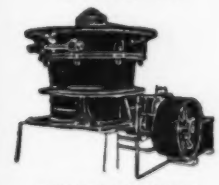
SAND TANKS



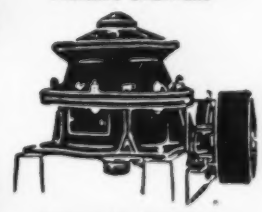
SAND DRAGS



JAW CRUSHERS



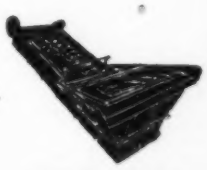
PRIMARY BREAKERS



REDUCTION CRUSHERS

BELT AND BUCKET ELEVATORS

GRIZZLIES



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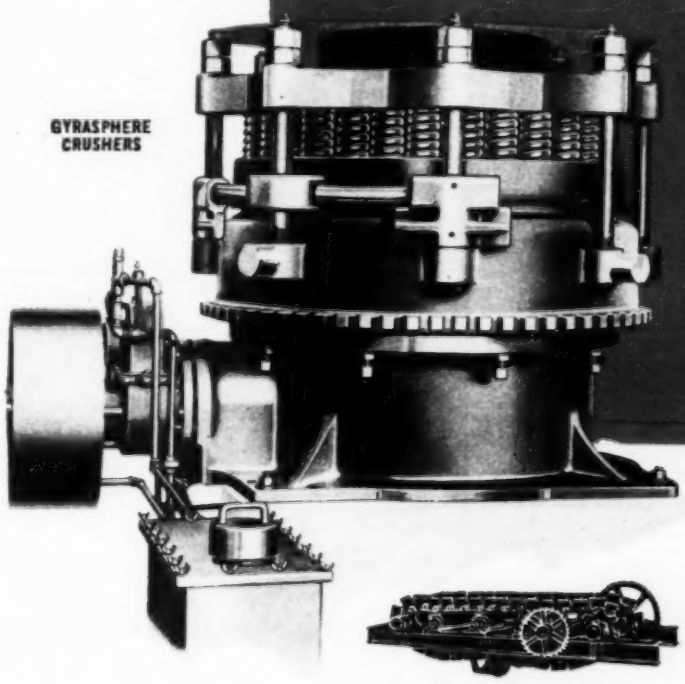
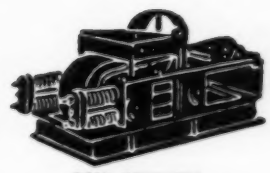
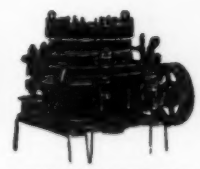


GYRASPHERE CRUSHERS

HEAVY DUTY FEEDERS



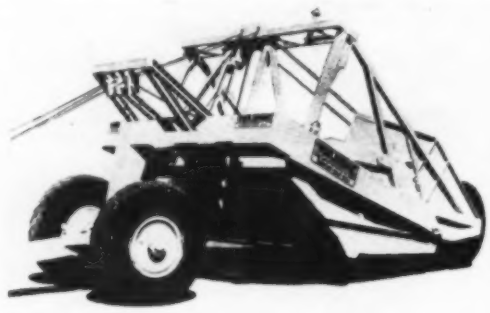
ROLL CRUSHERS



INTERCONE CRUSHERS

E-3

WEIGHT-SAVING SCRAPER. 17¾-yd. heaped capacity, has enlarged apron opening, 53½ in., which permits loading and dumping in less time of larger volume of earth, bigger clods and more massive rocks. New "durabelt" construction features huskier, larger yoke and inner-braced, double one-piece bot-



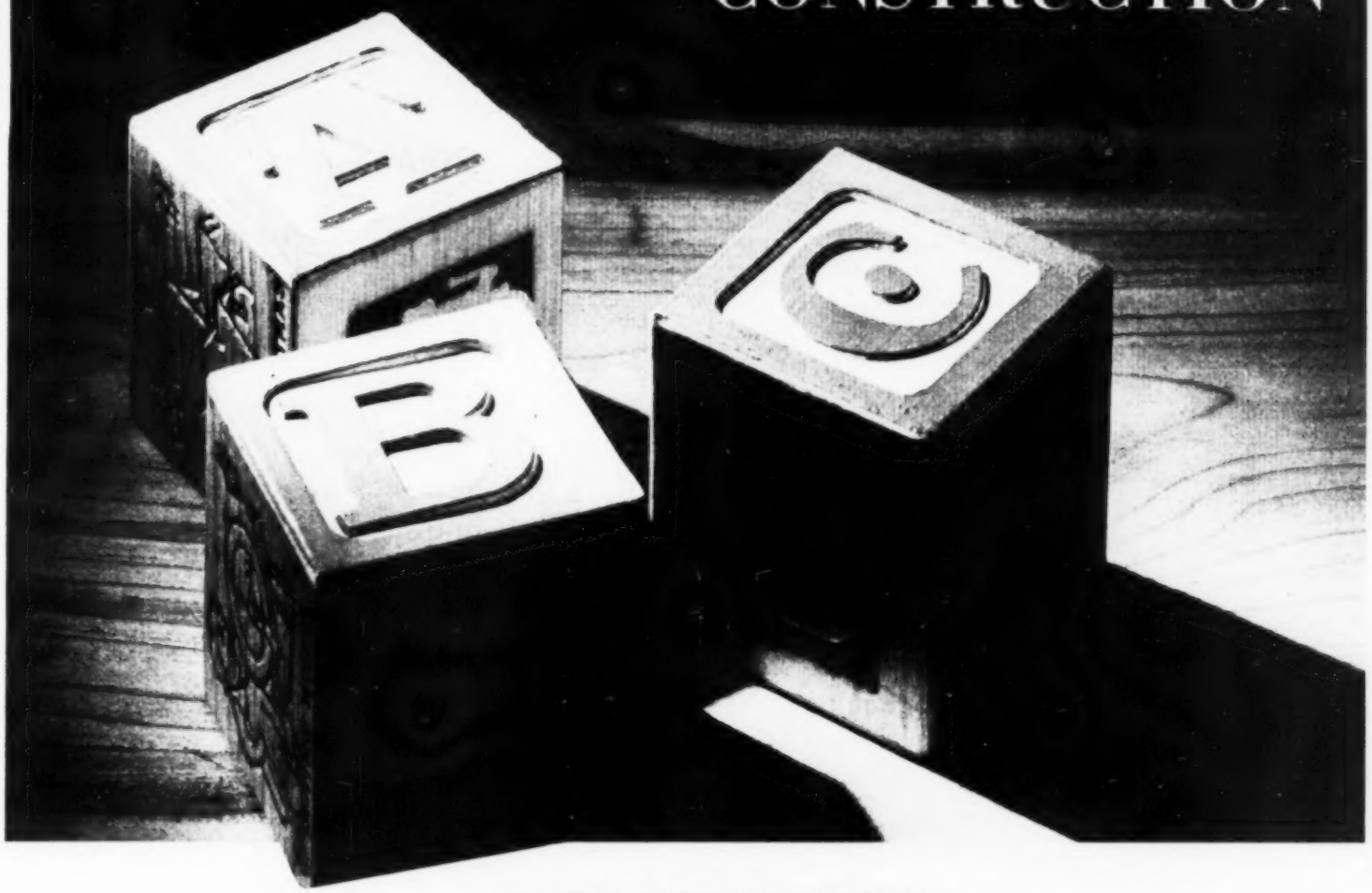
tom. With fewer sheaves and 42 ft. less cable required, cable is said to show considerable reduction in cable wear, upkeep and repair. Further simplification has been brought about by elimination of spring box and sixty parts. Although more rugged in construction, these scrapers are said to save nearly ¾ ton in weight, permitting larger loads and greater heaped capacity. — **Wooldridge Mfg. Co., Sunnyvale, Calif.**

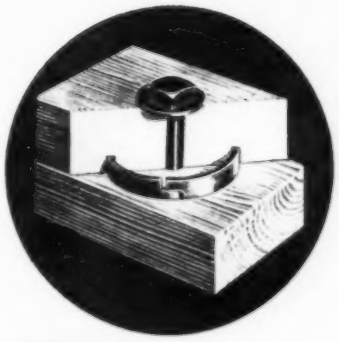
★ ★ ★

SQUEEGEE-TYPE PUMP, operating on new "squeegee" principle unlike that of centrifugal, rotary, reciprocating, screw or diaphragm pumps, consists of flexible rubber tube which is alternately squeezed and released so that liquid or gas is breathed into and out of tube. Tube is made of combination of pure gum rubber and various acid and oil resisting materials and may also be lined with synthetic material in order to resist corrosion and prevent contamination. Cleaning and sterilization claimed to be easy and not to require taking pump apart. Solutions containing solids said to cause practically no wear as inside of tube is smooth, continuous surface with no projections, corners or crevices. Squeegee operating principle consists of

rotating drive shaft keyed to "off center" door which itself is keyed to adjustable eccentric, adjustments providing adequate take-up for wear on tube. Shaft and both rotors turn as unit inside compressor ring, thus pushing ring out radially against tube. Action continues progressively along curved portion of tube, producing rocking squeegee action from suction to discharge side. Compression of tube advances liquid or gas, while expansion of tube, back to its normal diameter, produces high vacuum which inhales more liquid which will be exhaled in following cycle of "breath-pumping" action. Tube guide plate attached to discharge side of compressor ring prevents expansion of tube beyond its normal diameter at this one point under pressure where tube is not surrounded by pump housing or compressor ring. Pump requires no foot valves, no priming and no stuffing boxes. May be had in single and double stage units, in six standard sizes delivering capacities ranging from ½ g.p.m. up to 50 g.p.m. with suction lifts up to 25 ft. and discharge pressures up to 50 lb.—**Downingtown Manufacturing Co., Huber Pump Div., Downingtown, Pa.**

ABC's OF THE *TECO* SYSTEM OF CONSTRUCTION





TECO CONNECTORS

spread the load on a timber joint more equally over the cross-section of the wood.

The TECO CONNECTOR SYSTEM IS.....

. . . a new method of structural engineering in timber that strengthens joints and permits lighter members to do work that formerly required heavier timber.

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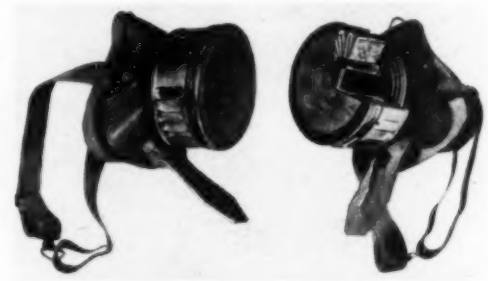
RESPIRATOR which is said to afford maximum protection against inhalation of pneumoconiosis-producing and nuisance dusts, to be lighter and easier to breathe through, more comfortable to wear and easier to clean and maintain than previous models. Scientifically and compactly designed cartridge



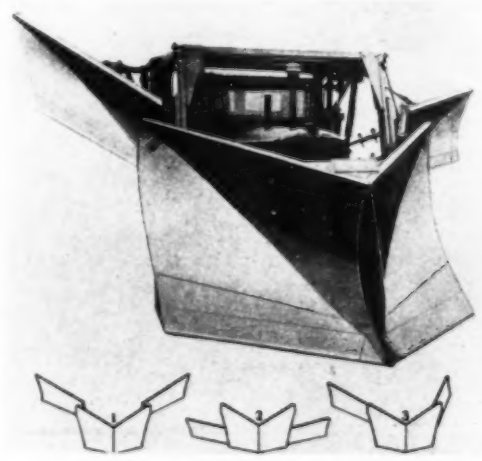
measuring 2⅞ x 1½ in. and weighing 1 oz. provides 41 sq. in. of breathing and filtering area. Ingenious multi-vane construction allows every inch to be used efficiently with no air restriction to cause difficulty in breathing, and with greatly increased filtering efficiency. Filter is cleaned by blowing accumulated dust from vanes with air dusting gun or nozzle, thus maintaining peak performance and requiring less frequent replacement. Designed to fit, closely and without leakage, contour of practically any face.—**DeVilbiss Co., Toledo, Ohio.**

★ ★ ★

BLACK-OUT COATING for industrial plant windows and sky lights is said to meet all specifications and recommended practices and to be easily removable when necessity no longer exists. This coating, known as Carbozite Standard Blackout Black, is not paint but liquid coating manufactured from pyrobitumen ore refined and mixed with quick drying volatile solvents and an ingredient said to assure complete opacity and gloss free surface. No preference rating or priority is needed to obtain this coating so its ingredients are not in demand for munitions or other war materials. May be sprayed or brushed on quickly. One coat only is required to assure complete protection and drying is completed in from 6 to 8 hr., assuring dull finish stressed in recent black-out recommendations to neutralize effects of searchlights and aerial flares. Claimed not to sag, peel, chip or check at temperatures ranging from —40 deg. F. to 450 deg. F. Easily applied to glass and gives close bond and uniform adherence.—**Carboxite Corp., First National Bank Bldg., Pittsburgh, Pa.**

★ ★ ★

"V" AND SIDE-WING SNOW PLOWS, made for use with all models of Allis-Chalmers tractors, feature independent hydraulic wing control. By means of two hydraulic cylinders for each wing, positive independent wing operation is provided; front, rear or both ends of wings can be raised or lowered or folded in tight against tractor while idling or under



way. High "V" plow hugs front of tractor and is hydraulically controlled with four-way valve for raising, lowering, floating or forcing blade down to cut ice or packed snow. Flexible hydraulic operation of these plows, plus independent side-wing control is said to accomplish faster, cleaner snow removal on high drifts and ice incrusted packed snow and that average to heavy snowfalls can be handled easily at top tractor speeds.—**Baker Mfg. Co., Springfield, Ill.**

FIVE 9-CU.YD. DUMP UNITS with body dimensions 13 ft. 9 in. long, 6 ft. 6 in. wide and with 30-in. high sides were recently delivered to Oliver Iron Mining Co., of Duluth, Minn. Cab protector extends over top of cab and bodies are equipped with set of detachable sideboards, which, when installed for use in stripping operations, will increase capacity of bodies 10½ cu.yd. Bodies have scoop ends and can be dumped in not more than 20 sec. Twin-cylinder outside mount telescopic hoists raise and lower bodies for dumping operation.—**The Heil Co., Milwaukee, Wis.**

★ ★ ★

PNEUMATIC-TIRED, WHEEL-MOUNTED CRANE, small mobile unit designed to travel quickly from job to job, for ease in handling on road and at work, to be operated by one man and with but one motor, has wide range of speeds for traveling, hydraulic steering and mechanical hydraulic brakes on rear wheels. Main truck chassis is made up of I-beams and diaphragms with welded joints, giving sturdy base for upper body. Rear axle is solid steel with turned ends for dual wheels of cast steel which

have one-piece brake drum and driving sprocket. All wheels, roller-bearing mounted. Front axle pivoted in center to provide three-point suspension for frame. Bevel gear type differential is carried on ball bearings and operates in oil bath. Screw jacks are provided on rear bumper plate to relieve tires of excessive loads when making heavy lifts. Clark truck-type transmission provided on deck, driven by roller chain, and powered through Lipe clutch. Deck transmission is arranged with four speeds and reverse. Gear shift lever located beside operator. Clutch operated by automotive foot-type pedal. Through speed change gears in transmission, two additional speeds are available, giving speed range from .86 to 10 m.p.h. Machine steered by hydraulic cylinder. Mechanical hydraulic-type brakes. Independent boom hoist operated by twin-disk clutch, with final drive through bevel gears and worm and worm wheel for safety is optional. **— The Osgood Co., Marion, Ohio.**

Here's The MACHINE That Screeds Concrete

Faster — Better — Cheaper!

WHITEMAN Portable Rodding Machine. Weight without screeds, 237 lb. In operation, the two rod sticks (screeds) ride the headers. Driven by the Wisconsin gasoline engine, the rod sticks make 5 in. transverse strokes 2½"—in opposite directions. During the power-driven transverse movement, a steady pull by the operator provides a uniform rate of advance. This leaves a pour that has been simultaneously levelled and condensed—ready, when sufficiently set, for final finish by the WHITEMAN Precision Finishing Machine.

The WHITEMAN Portable Rodding Machine is made by the manufacturers of the WHITEMAN Precision Finishing Machine (shown below) which is making speed and cost records on large and small concrete floor jobs throughout the country.

Now power screeding is available to speed the laying and cut the costs of concrete floors for the alert contractor.

One man using the WHITEMAN Portable Rodding Machine with its power operated screeds, simultaneously levels and condenses dry, one-inch slump concrete with ease. The Portable Rodding Machine eliminates the slow, back-breaking labor of hand screeding concrete, leaving your men fresher for other work. The action of the screeds puddles and condenses the concrete into a solid mass throughout the entire depth, bringing the moisture to the surface—ready, when sufficiently set, for final quick finish with the WHITEMAN Precision Cement Floor Finishing Machine.

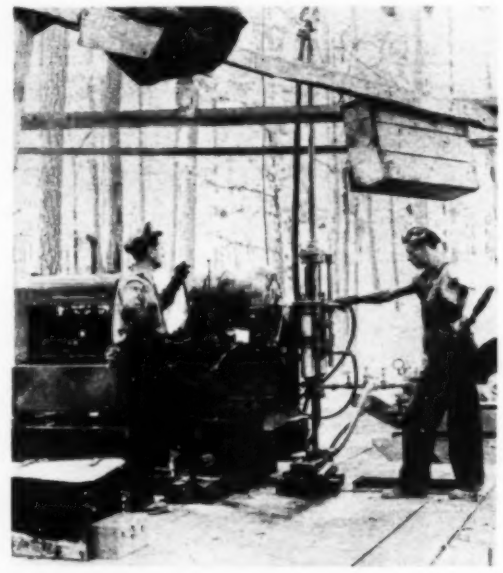
Speed your construction—screed concrete floors at lower cost—with the WHITEMAN Portable Rodding Machine. Driven by a light-weight Wisconsin gasoline engine *this machine easily keeps ahead of any ordinary method of concrete delivery.*

Write or wire Dept. CM342 TODAY for full details on this PROVED machine.

WHITEMAN MANUFACTURING COMPANY

3249 Casitas Avenue—Los Angeles, California

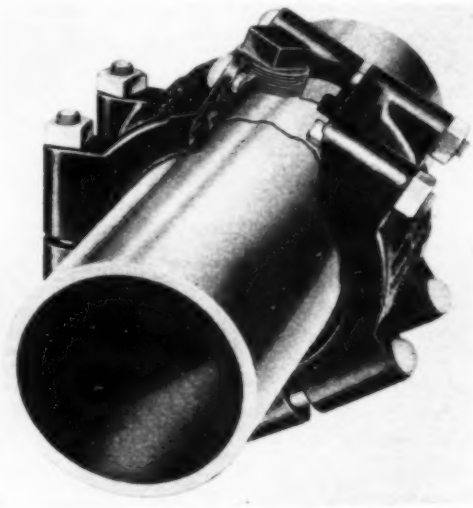
HEAVY-DUTY CORE DRILL for use in coal and mineral prospecting, oil field service or testing foundations for heavy construction, is built for surface drilling under tough operating conditions and is rated at 1,750-ft. capacity with E rods. Unit is direct drive machne with power unit connected to drilling head through 4-speed automotive type transmission by built-in clutch which permits use of any power unit



having stub shaft (electric, gasoline or diesel) if operating characteristics are suitable. Controls said to be conveniently grouped, all gears are inclosed and hand lever safety clutch permits runner to stop rotation of beveled drive gear when swivelhead is open while running or pulling rods. Swivelhead, large hoisting drum and clutch and power unit mounted on rigid skid base. Unit may be dismantled into four main parts for mule-back transportation, if desired. — **Sullivan Machinery Co., Woodland Ave., Michigan City, Ind.**

★ ★ ★

ADJUSTABLE REPAIR SLEEVE is claimed to fix breaks, holes and splits in straight runs of cast-iron pipe, without service interruptions, by inclosing defective pipe in pressure-tight chamber. Consists of three individual sections, each complete with one side gasket and two end gaskets factory assembled and fitted into deep recess to prevent coming out of position while sleeves are in stock or during installation. Three sections are assembled into complete sleeve with 6 side bolts, which, when tight-



ened, give full compression on all gaskets. Escape vent facilitates installation under pressure. With new repair sleeve, diameter of pipe to be repaired may be matched exactly, "diameter-finding" tape telling combination of sections to use. Adjustment range is from 4.70 OD to 5.10 OD for 4-in. sleeve and from 6.80 OD to 7.20 OD for 6-in. sleeve. Rubber pack incorporated in sleeve provides for absorption of expansion and contraction in broken cast-iron mains and permits tight pack on pipe offset as much as ⅝ in. Time studies by maker have proved that one workman with wrench can install repair sleeve in from 5 to 10 min. Recommended for working pressures not exceeding 150 lb. per sq.in. — **Dresser Manufacturing Co., Bradford, Pa.**

"Greater Yardage,

less maintenance expense – that sums up our experience with GULF PRODUCTS"

says highway contractor

W. H. Anderson, Asheville, N. C., is building a park-to-park highway near this city that involves the moving of 500,000 cubic yards of dirt and rock and the cutting of two tunnels. Gulf products are helping this contractor do a speedier, more profitable job.

"OUR experience with Gulf higher quality lubricants and fuels proves their value on any kind of a road-building job," says the contractor on this highway project. "With Gulf products in service, we get efficient performance from our equipment and avoid mechanical delays—which add up to *greater yardage* and *less maintenance expense.*"

You, too, will find it *more profitable* to use Gulf quality lubricants and fuels on *your* next contract. Call in a Gulf engineer today and ask him to recommend the right product for each particular requirement. His recommendations are based on thorough training and broad experience gained through daily contacts with contractors' problems in the field. And his one big aim is to help insure a speedier job with low maintenance costs for your equipment.

No matter where your job is located, you are sure of quick delivery of Gulf quality lubricants and fuels through more than 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

GULF

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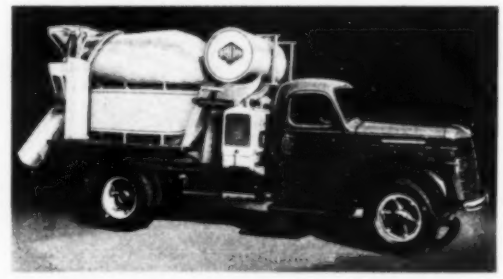
OF POSSIBLE USE IN CONSTRUCTION FIELD is this car-icing unit which is equipped with dual hydraulic hoists for raising truck body to roof level.—**Gar Wood Industries, Inc., Hoist & Body Division, Detroit, Mich.**

★ ★ ★

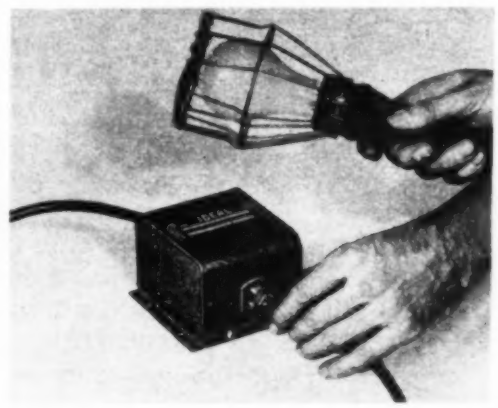
NEW MOBILE TRUCK MIXER has ratings of 3½ yd. for truck mixing, 4.27 cu.yd. for shrink mixing and 4.58 cu.yd. for agitating. Larger 165-cu.ft. drum volume and sturdy lightweight construction said to permit much larger pay loads. Compact, streamlined design has resulted in substantial decrease in weight



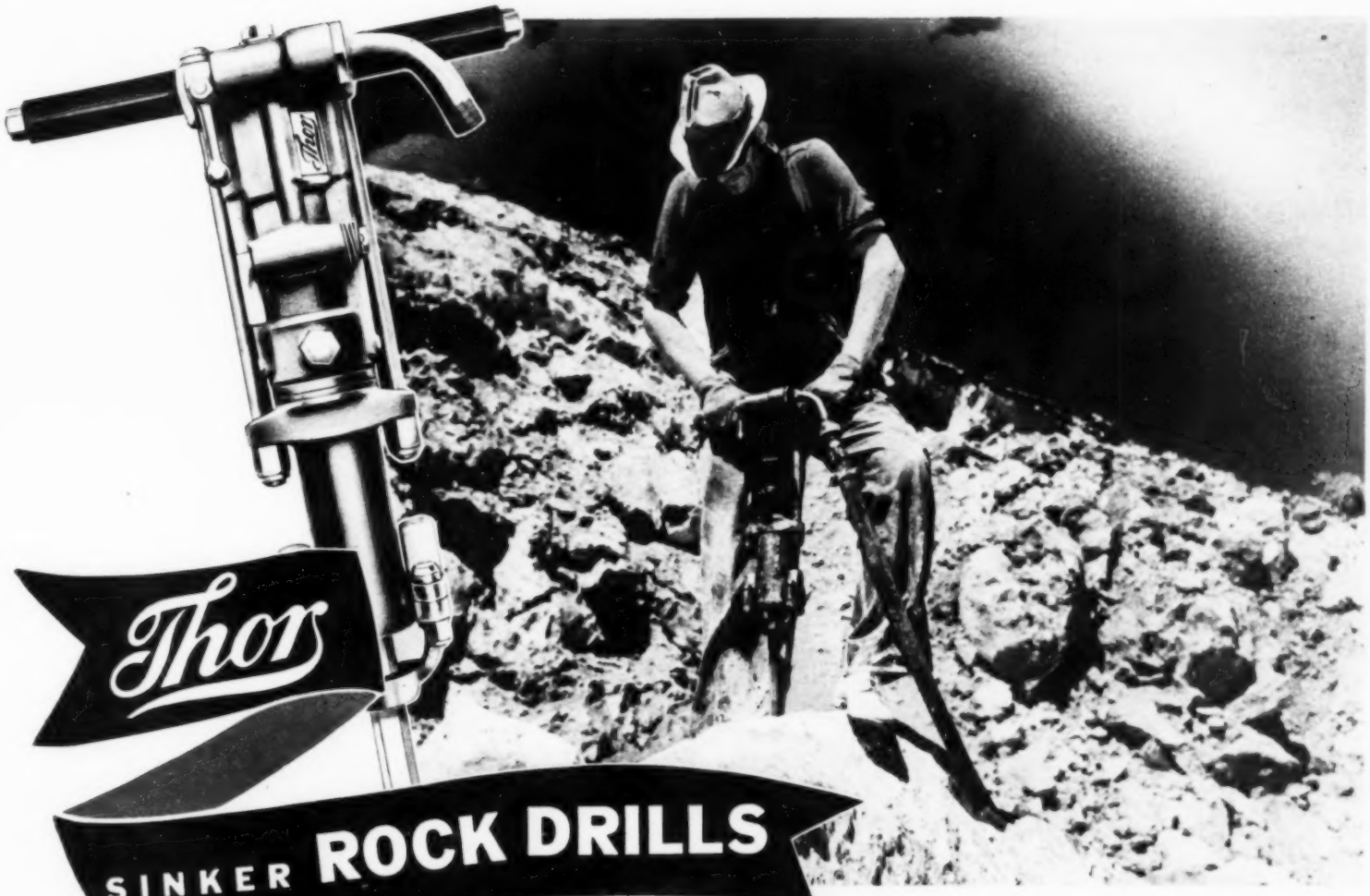
in comparison with other models of like capacity. Also claimed to be much faster in charging, mixing and discharging, especially for drier and stiffer mixes. Other features: All-geared, fully inclosed transmission; totally inclosed, oil-tight pump drive; drum opening, 36 in., with self-centering feed chute; seal-tight self-cleaning closing door with worm and worm-gear operating unit; water tank, 160-gal. capacity with larger overflow pipes; powered by 42.5 hp. engine.—**The T. L. Smith Co., Milwaukee, Wis.**

★ ★ ★

STEP-DOWN TRANSFORMER, new safety device for workmen using electrical extensions in damp, all metal or otherwise hazardous locations, is said to be easily plugged in between power supply and extension to reduce voltage to 6 v., thus eliminating danger from shock caused by bad sockets or de-



fective extension cords. Lo-Volt transformer has 10-ft. three-conductor safety-type primary cord. Capacity is 50 watts with 25-ft. extension. Longer extensions require proportionately lower watt lamps. Available for 110-v. 50-60 cycle or 25-cycle a.c. Weights, 60-cycle, 4½ lb.; 25-cycle, 6¾ lb.; Size 2⅞x 3⅞x4 in. Particularly recommended for inspection of maintenance work in excavating projects, steel tanks and ships.—**The Ideal Commutator Dresser Co., 1368 Park Ave., Sycamore, Ill.**



FOR MORE FOOTAGE PER SHIFT

ON TOUGH, DOWN-HOLE DRILLING

Thor Sinker Rock Drills in every weight class have an *extra* margin of power that means the difference between ordinary and *outstanding* footage on down-hole rock drilling. They hit hard and fast because they actually use most effectively ALL of the air that enters the machines. Basic reason for this is the patented Thor short-travel, tubular valve (with a controlled tolerance of .00025") that measures and admits exactly the right amount of air for peak operating efficiency.

Positive Control — High Average Drilling Speed

Thor's precision valve action, *plus* a quick-acting throttle valve, gives drill runners positive control for all operating conditions. This means powerful rotation for hole starting with quick acceleration to top speed for drilling and plenty of air for clean hole blowing. Results — high average drilling speed and *more* holes per shift.

Easy Holding — Sturdy Construction

Just as Thor's principle of "Measured Air" assures full efficiency and control, so also does it provide easy handling. With every stroke powered by the same amount of air, operation is smooth and uniform. Naturally, minimum vibration contributes to longer life, as do the air-cushioned retainer, automatic lubrication and drop-forged steel construction. Today, on scores of road building, shaft-sinking, tunnelling and other projects Thor Rock Drills are delivering more footage per shift.

For All Your Portable Tool Needs — **ROCK DRILLS, PAVING BREAKERS, SHEETING DRIVERS, CLAY DIGGERS, BACK FILL TAMPERS, SPIKE DRIVERS, CONCRETE SURFACERS, SAWS, HAMMERS, DRILL STEELS, DETACHABLE BITS, HOSE AND HOSE FITTINGS**

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO, ILL.

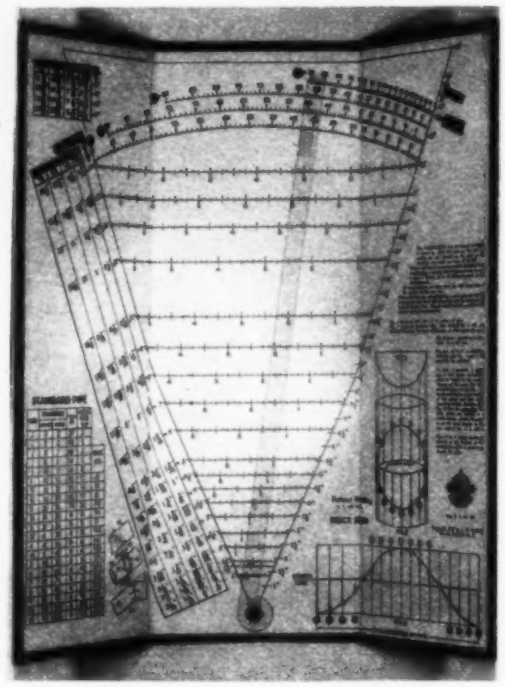
Branches in Principal Cities

A THOR SINKER ROCK DRILL FOR EVERY DRILLING JOB

7 standard models for light, medium or heavy duty work in the most popular weight classes. Other types available for special applications.

MODEL NO.	TYPE OF SERVICE	WEIGHT CLASS
38	Light Duty	45 Lb.
39	Auger Drill	45 Lb.
70 Series	Medium Duty	55 Lb.
85-B	Heavy Duty	80 Lb.

ANGLE METER, claimed to solve problem of templates for welding and sheet metal industries, is slide rule which enables man on job to lay out directly on pipe or flat material any angle bend from 0 to 90 deg. Using method of measuring in both directions from center line, it requires only four measurements to mark pipe or stretch out in six-



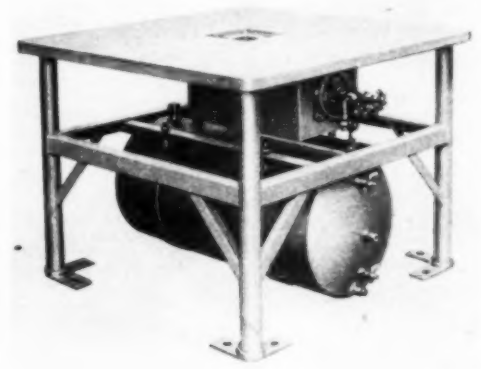
teen different points on circumference. All measurements are taken from right-hand side of pointer to zero line. Where lines are not calibrated, rule is placed with end against right-hand side of pointer and measurements read at zero line. Rule should be held parallel to nearest existing horizontal line. Although angle meter is laid out to give direct reading for pipes up to 20 in., by using proper multiple, range is unlimited. — **Interstate Sales Co., 1123 Broadway, New York City.**

★ ★ ★

EAR PLUGS or "Defenders" for use of workers engaged in noisy operations are said to reduce noises by 35-45 decibels or to about 1/10 of former loudness and still permit warning signals and conversations to be heard. Consists of tapered tube molded from

surgical-type soft rubber which contains two barriers, an outer one of metal and an inner one of soft rubber, separated by air space. Tapered construction assures easy insertion and removal without danger of coming in contact with ear drum. Easily cleaned with soap and water. Packed in plastic pocket container with spring hinge cover.—**Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.**

FORGES FOR BLACKSMITH, COPPERSMITH AND PIPE SHOPS burn fuel oil at 28 deg. Baumé and lighter with compressed air at 40 lb. or more pressure and are said to produce clean, smokeless fire up to 2,800 deg. F. under full control of operator. May be started and stopped instantly. By manipulating air control register of burner, an oxidizing or reducing flame is produced. Each forge has reinforced steel pipe frame with steel plate table top



Firebox, which is removable, and flame outlet are lined with firebrick. Welded steel fuel tank is fitted with filling funnel, strainer and valve and drain plug. Sizes of tables of three models: 18x24 in.; 42x42 in.; 72x72 in. Overall heights, 30 in. Sizes of openings: one model 4 in. square; other two 6 in. square. Tank capacities, 16 to 20 gal. Air consumption on model, 7½ c.f.m. maximum; other two, 15 c.f.m. maximum. Oil consumption: one model 1 to 3 gal. per hour; other two models 1 to 6 gal. per hour. Net weights respectively, 290, 575 and 110 lb. — **Hauck Manufacturing Co., 124-136 Tenth St., Brooklyn, N. Y.**

★ ★ ★

NARROW-WIDTH ACETYLENE TANK CART has three marked advantages, according to its makers: (1) Width of 24 in. enables it to pass through nearly any door or passageway; (2) instead of carrying two tanks side by side, they are set one behind other, assuring narrow width necessary for shops or crowded aisles; (3) chassis is mounted on two large pneumatic-tired wheels with fully depressed

hubs and 30x3½-in. heavy-duty tires, so that carts may be wheeled over rough, uneven ground or littered floors. Either tank may be moved independently of other as acetylene cylinder is inserted at front while oxygen tank is placed in rear of cart. Frame of unit is constructed of all-steel tubing. Bottom plate rests flush on floor when tank is standing, assuring proper support. Big steel tool box and two rod holders for long and short rods are conveniently attached to each cart. — **Garlinghouse Brothers, 2416 E. 16th St., Los Angeles, Calif.**

LUBRIPLATE lubricants are manufactured in various fluid and non-fluid densities to meet every condition and are packed in containers from one to five hundred pounds.

HERE'S THE LUBRICANT THAT'S MEETING TODAY'S URGENT NEEDS

That may sound like a bold statement—but it is being proved daily by thousands of users in every industry. LUBRIPLATE lubricants reduce friction and wear, save power and greatly prolong the life expectancy of plain and anti-friction bearings, gears, chains and other machine parts regardless of how tough the operating conditions may be. LUBRIPLATE is different from conventional lubricants—and is not only superior for modern machinery—but it enables old production machines to be stepped up to today's requirements. In these days of extreme emergency when machines are run at top speeds, and when replacement parts are hard to get—*LUBRIPLATE IS AN ESSENTIAL.* Write today for your copy of "THE LUBRIPLATE FILM" describing the use of LUBRIPLATE in the CONSTRUCTION INDUSTRY.

LUBRIPLATE DIVISION
FISKE BROTHERS REFINING COMPANY
SINCE 1870
Newark, N. J. Toledo, Ohio
DEALERS FROM COAST TO COAST

LUBRIPLATE

THE MODERN LUBRICANT *that Arrests Progressive wear*

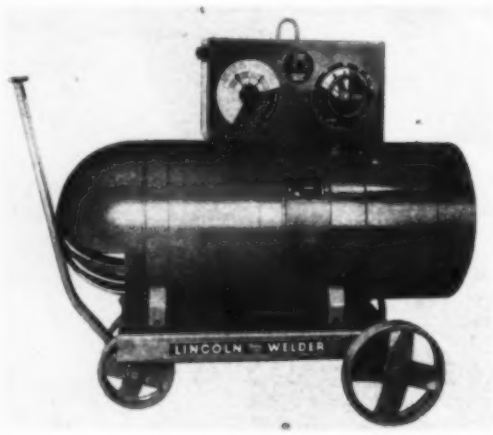
"Its the Film"

SELF-CONTAINED RADIO TELEPHONE COMBINATION TRANSMITTER AND RECEIVER weighing 4 lb. is now available for use of governmental agencies and services, including municipal divisions, public utilities, fire and police departments, railroads and other transportation agencies, subject to licensing by Federal Communications Commission and priority rating. Built-in battery power supply for new Weltronic "Trans-Ceiver" under continuous opera-

tion has rating of about 8 hr., equivalent to approximately a month's operation under normal intermittent service. Power supply derived from standard commercial batteries in order to keep battery replacement cost to minimum and to facilitate maintenance of operation. With range of about 1 mi. overland, units are provided with off and on switches and finger operated selector to change from transmitting to receiving and vice-versa while talking through unit. Although designed for operation on single wave length, thus requiring no tuning in service, frequency range is adjustable from 112 to 300 megacycles by screw adjustment. Also provided are volume control and adjustable, fish-pole type of aerial.—**Weltronic Corp., E. Outer Drive, Detroit, Mich.**

★ ★ ★

ARC-WELDING MACHINES, equipped with improved dual continuous control which eliminates need for meters showing volts and amperes, has both job selector and current control calibrated and equipped with dials which indicate type of work and number of amperes for every setting. This feature is said to enable welding operator to obtain high quality welds and high welding speeds because he can vary both slope of volt, ampere curve and amount of welding current independently and positively to suit each job encountered. An-



other feature: both voltage (job selector) and current controls are continuous in operation, making possible numerous combinations of voltage and current and providing for exceptionally wide welding range in types of work, welding conditions, sizes of electrodes and thicknesses of material. As control is continuous, it may be advanced or retarded in increments as fine as desired. Advantages according to manufacturer, include (1) ability to set and read current from dial; (2) elimination of trouble and expense resulting from meter breakage; (3) elimination of meter inaccuracy after few months' use in service in field; (4) availability of positive polarity reversal; and (5) ability quickly to verify polarity by noting position of switch handle. **— The Lincoln Electric Co., 12818 Coit Road, Cleveland, Ohio.**

MEDICAL-SURGICAL BUILDING, State Hospital, Concord, N. H.
OWNER: State of New Hampshire
ARCHITECT: Wells, Hudson & Granger, Hanover, N. H.
GENERAL CONTRACTOR: Davison Construction Co., Manchester, N. H.

3-WAY SAVING
PLUS QUICKER COMPLETION!

Perhaps quicker completion, earlier readiness for occupancy is the important thing; maybe lower construction costs matter more. There's a way to enjoy them both.

In the job shown here, the use of Lehigh Early Strength Cement in the three upper floors saved (1) the purchase of 13,000 sq. ft. of plywood panel forms; (2) 5 days' construction time on each floor; (3) the cost of 5 days' heat protection on each floor . . . besides helping to get the building more quickly into service.

Making service-strength concrete in 1/3 to 1/5 the usual time, Lehigh Early Strength Cement permits forms to be stripped sooner and re-used . . . speeds up the progress of other phases of the work . . . cuts construction time and costs . . . paves the way for quicker occupancy . . . encourages cold weather operations by reducing danger of frost damage and expense of heat protection.

Both winter and summer, the use of Lehigh Early Strength Cement is reflected in the profit you make and the service you give. Any questions you have about the qualities or performance of this modern-day product will be gladly answered by the Lehigh Service Department.

Lehigh EARLY STRENGTH CEMENT

for **service-strength** concrete in a **hurry!**

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

FOUR-WHEELED, LIGHTWEIGHT PNEUMATIC-TIRED TRAILER for mounting electric drive welders is said to make these units doubly useful, enabling them to complete hurry-up trips to different parts of plant and yard for emergency production, maintenance and repair jobs. Welder is attached to trailer by four bolts. Low, underslung construction, narrow 27-in. tread and method of balancing make moving of unit easy. Arc-welded construction throughout. Weight, 120 lb.; overall height, 45 in.; overall width, 33 in. from hub to hub; tilting angle 25 deg.; 14-in. jumbo 4-ply tires. — **Hobart Brothers Co., Troy, Ohio.**

★ ★ ★

PULVERIZED ASPHALT PRODUCT, known as U-Mix-It, is said to be effective for waterproofing leaky concrete blocks. This material is a blend of high melting point and natural asphalts mixed with solvents to proper consistency for brush, trowel or spray application. Material serves as positive waterproofing and sealing compound. Walls are first wirebrushed to remove all loose particles and then a prime coat of U-Mix-It without addition of sand is applied. After this soaks into masonry, 1/8-in.-thick second coat is applied in which is added white sand in proportion of 1:1, completely sealing wall. To obtain light color, material then is painted over with water base cement paint. One pound of U-Mix-It covers about 10 sq.ft. U-Mix-It and asbestos with No. 5 fuel oil as solvent has also been used satisfactorily as calking material for windows.—, **Allied Asphalt & Mineral Corp., 217 Broadway, New York City.**

TRAILER-TYPE MOBILE CHLORINATING UNIT for emergency water purification in case of damage from bombs, explosion or sabotage to regular water system is demonstrated in New York City before officials of Department of Water Supply, Gas and Electricity. This unit, recently developed by Wallace & Tiernan Co., Inc., Belleville, N. J., has special facilities for hooking up to broken mains. Many of its features were incorporated as result of experience gained in safeguarding water in "blitzed" English cities.

★ ★ ★

BOX-PATTERN WRENCH has been added to line of chrome-molybdenum "Superrenches" to bring greater safety to structural work. Twelve-point box head said to insure firm hold on nut and offset handle to provide maximum clearance. Long tapered handle

provides ample strength and leverage and is said to be type preferred by steel workers for lining up bolt holes. Available in six sizes with openings 1 7/16 to 2⅜ in. accommodating U. S. Standard nuts ⅞ to 1½ in. Forged from chrome-molybdenum steel, heat-treated and finished in baked gray enamel.—**J. H. Williams & Co., 225 Lafayette St., New York City.**

★ ★ ★

SMALL, COMPACT COMPRESSOR, said to be ideal for drilling, spraying, riveting, chiseling, chipping, stone carving, sand-blasting, inflating tires and numerous other operations employing compressed air, has 4-cylinder V-type construction that does not require cooling unit or running water. May be had

with various mountings, either V-belt or direct motor drive, on air receiver base or overhead tank suitable for pressures up to 200 lb., and can be operated at full or reduced speeds for minimum or maximum loads depending upon requirements. As it is lightweight, compact and without vibration, it may be bolted to any level foundation, thereby eliminating expensive platforms, supports or foundations.—**Schramm, Inc., West Chester, Pa.**

Preformed Flattened Strand

"HERCULES" (RED-STRAND) REG. U.S. PAT. OFF. **WIRE ROPE**

A Time and Material Saving Combination

There are three definite and outstanding factors that enable Preformed Flattened Strand "HERCULES" (Red-Strand) Wire Rope to help you speed up production and at the same time conserve needed raw material.

1. **As it is Preformed it is easier and quicker to handle . . . it spools more smoothly and evenly . . . it offers greater resistance to fatigue.**
2. **Due to the exclusive advantages of the Flattened Strand construction, it is stronger . . . more compact . . . and because it has a larger and smoother surface, it is better able to resist wear.**
3. **Being of the "HERCULES" grade, it is "tops" in quality and advanced manufacturing methods.**

Why not utilize the advantages of this wire rope? Its longer life will not only save time and materials—but money as well.

"HERCULES" (Red-Strand) Wire Rope is also made in all of the Standard Round Strand Constructions—both Preformed and Non-Preformed. A "misfit" rope, either in type; construction or quality, will definitely reduce efficiency. Our experienced Engineering Department will be glad to help you overcome this handicap.

Made only by

A. LESCHEN & SONS ROPE CO.

Established 1857

5909 Kennerly Avenue, St. Louis, U.S.A.

BRANCHES:

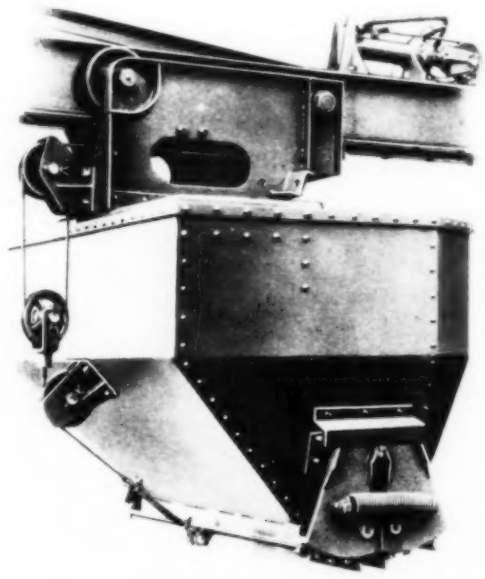
New York	90 West Street	San Francisco	520 FourthSt.
Chicago	810 W. Wash'ton Blv.	Denver	1554 Wazee St.
Portland	914 N. W. 14th Ave.	Seattle	3410 First Ave. South

POWER-DRIVEN SCREED for concrete paving, indoors or out, is said to enable one man to handle 4 cu. yd. of low-slump concrete in 5 min. Driven by Wisconsin 2.3-hp. air-cooled gasoline engine, two screeds of this machine make 5-in. transverse strokes in opposite directions. During this movement screeds move forward uniformly under the pull of

operator. Vertical disks steady machine and prevent it from moving transversely with screeds. These disks are adjustable so they will sink to desired depth in concrete; they relieve screeds of some of weight and serve as wheels when machine leaves work. Machine weighs 235 lb. without screeds which are readily detachable. Best results are claimed for 2x6-in. screeds tapered at ends and shod with angle iron. Levelling and vibrating action is said to make it easy for one man to screed very dry concrete in less time than would be required for hand screeding.—**Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles, Calif.**

★ ★ ★

HYDRAULICALLY CONTROLLED BOOM BUCKET permits bucket doors to be opened or closed to any degree at any position on boom, and allows entire drum batch to be discharged into bucket or any amount of bucket load to be deposited as desired. All inside and outside levers and arms have been eliminated, and boom bucket carriage has no op-



erating parts requiring adjustment or repairs, thus reducing dead weight of bucket and minimizing strain on boom when bucket is in spreading motion. Since no stop is necessary in order to close bucket doors, concrete may be deposited even when unit is in its innermost position. Noise of bucket hitting door closing stop also is eliminated. Bucket doors slide open instead of dropping which provides 23-ft. clearance from ground with doors open and 31-in. when closed—adequate to clear strike-off devices or other obstructions.—**Ransome Concrete Machinery Co., Dunellen, N. J.**

Contractors! Engineers!

Consult this handy check chart for the tires that will save rubber on *your* job!

Tire	Type of Service	For Use On	Typical Application
Earth Service Silvertown	Excavation Soft Earth	Drive wheels Tractors Trucks Scrapers	Common Excavation Levee Work
Rock Service Silvertown	General Excavating, especially in rock	Drive Wheels Trucks Tractors	Common Excavation Quarrying Mining
Universal Super Traction Silvertown	Off the highway, semi-improved roads	All Wheels Trucks Tractors Scrapers	Mining Quarrying Excavating Logging
Trailer Service Silvertown	General Excavating	Trailing Wheels Scraper Buggies	Common Excavation
Tractor Grader Super Traction	Off the highway	Drive Wheels Motor Graders Tractors	Roadbuilding Maintenance
Tractor Grader HD Ribbed Type	Off the highway	Front Wheels Motor Graders All Wheels Pull-Type Graders	Roadbuilding Maintenance
Truck-Bus Super Traction Silvertown	General Purpose	All Wheels Dump Trucks Batch Trucks	Roadbuilding General Contracting
Commercial Super Traction	Combination on and off the highway	All Wheels Pick-Up Trucks Station Wagons	General Purpose

● In the big B. F. Goodrich line there's a tire especially suited to the operating conditions on *your* particular job—whatever its nature. Choose this "just right" tire and you'll get better service plus longer mileage. You'll conserve rubber for Uncle Sam and at the same time save money for yourself.

Today, as construction buckles down to the rush assignments of the war effort, B. F. Goodrich tires, hose, belting, accessories, and rubber footwear are on the job—coast to coast. For one dependable source of supply for *all* your rubber product requirements—see the B. F. Goodrich man *first!*

Write for Free Tire Booklet

You don't have to be an expert to choose the "just right" tires for your particular job with this book to guide you. Describes each off-the-highway tire in detail, tells the type of service it's designed for, and the type of equipmen. it's to be used on. Gives tips on tire care and maintenance that will help you conserve rubber and at the same time cut your tire bills way down. For your *free* copy write The B. F. Goodrich Company, Akron, Ohio, *today!*

In war or peace

B.F. Goodrich

FIRST IN RUBBER

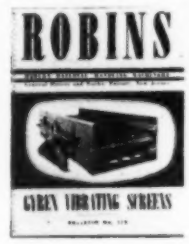
B.F. Goodrich Silvertowns

The Best Tires "On Earth"—for All Types of Construction Work

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

VIBRATING SCREEN—**Robins Conveying Belt Co.,** Passaic, N. J. (21 pp., illustrated.) New Bulletin No. 115 illustrates and describes in detail Gyrex vibrating screens made in a variety of sizes—from 24x54 in. to 72x192 in.—weights and types, and with one, two or three decks, for handling sand, gravel, stone and other materials. Design features include positive eccentric shaft vibrator element, circle-throw, sealed bearings, balanced stabilizing springs, speedy screen cloth change, and screw-adjusted counterbalance weights. A unique feature of bulletin is an "X-ray" section, using transparent cellophane inserts illustrating major elements of screen, which are superimposed upon each other, as reader turns pages, to indicate clearly step-by-step buildup of a complete screen. Technical data cover recommendations on selection and use of vibrating screens — such as size required, slope of screening surface, stroke, speed, feed and discharge chutes — and complete dimension tables for various standard sizes and types available. Photographs illustrate typical applications, particularly in sizing sand, gravel and stone for construction use.



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HYDRAULIC VISE PRESS—**Studebaker Machine Co.,** 9 S. Clinton St., Chicago, Ill. (6-p. folder, illustrated). Describes and illustrates hydraulic vise for production, tool room and maintenance work, such as press jobs, punching, bending, straightening, cutting, testing, stamping, riveting and assembling. Controlled by foot pedals, it permits use of both hands in setting up and removing work. Pressure developed between jaws said to be 1 to 10,000 lb. maximum.

★ ★ ★

ELECTRIC TOOLS—**Skilsaw, Inc.,** 5033 Elston Ave., Chicago Ill. (46 pp., illustrated.) Various electrically-powered tools designed for production, construction and maintenance, particularly as these operations relate to program for national defense. Range of tools includes saws, with blade diameters from 6 to 12 in., groovers, abrasive disks for scoring and cutting concrete, stone, tile and slate, drills with capacities from ¼- to ⅞-in. holes, belt and disk sanders, grinders, blowers, suction cleaners, floor sanders and floor edgers. Included, also, are numerous items of accessory equipment and attachments, including an automatic roof framer and miter box for use with electric saw in making rafter cuts at proper angles.

★ ★ ★

34E SINGLE-DRUM PAVER—**Koehring Co.,** 3026 W. Concordia Ave., Milwaukee, Wis. (12 pp., illustrated.) Describes and illustrates new UniBatch machine, claiming for it following advantages: Autocycle operation, batchmeter control; saving of seconds every operation; more batches per hour; air-operated discharge chute; extra long oscillating boom for long reach; boom swing full 180 deg. for wide distribution of concrete; twin door, full batch size bucket with doors opening in same direction; more concrete poured every shift with minimum of moves; lower operating maintenance and production costs; extra profit per job.

WHITE CONCRETE REFLECTING CURB—**Universal Atlas Cement Co.,** 135 East 42nd St., New York, N. Y. (30 pp., illustrated.) Covers design and construction of light-reflecting curbs, made with Atlas white cement, to increase safety of night driving. Curbs, with scored surfaces, are of two types: cast-in-place and precast. Results of research are given on design of corrugated curb surfaces to insure best light-reflecting characteristics. Pictures illustrate details of construction, forms and tools for producing scored surfaces. Drawings in blueprint form show types and dimensions of curbs and specifications are given. The booklet is profusely illustrated with night and daytime photographs.

★ ★ ★

NON-CLOGGING SEWAGE AND SLUDGE PUMPS —**Lawrence Machine and Pump Corp.,** 371 Market St., Lawrence, Mass. (4-p. bulletin illustrated). Gives all data on both horizontal and vertical models which embody modern practice in centrifugal design and practical experience of years in building of material-handling pumps, such as dredging pumps and sand and gravel pumps. These pumps are said to be simple in design and to be especially fitted for handling sewage and sludge containing rags, trash, fibrous material, grit and even large solids. Detailed description and illustration of mechanical features and pertinent specification data.

★ ★ ★

FOREST PRODUCTS INDUSTRIES AND THE WAR—**Timber Engineering Co.** 1337 Connecticut Ave., N. W., Washington, D. C. (32 pp., illustrated.) Shows

pictorially part forest products industries are playing in America's preparation of war, such as supplying timber for construction of barracks, portable bridges, hospitals, recreation centers and warehouses for the Army, mess halls, recreation halls, class rooms, roof trusses and armories for the Navy, prefabricated houses, homes for defense workers, drydocks, factories, mold lofts, assembly shops, shipyards, scaffolding and warehouses for defense industries and churches, theatres, piers, auditoriums, garages and warehouses for all industry.

★ ★ ★

WELDING TRAINING — **International Acetylene Assoc.,** 30 E. 42nd St., New York City. New Book, "Training Oxyacetylene Welding and Cutting Operators—Instructors' Outlines" has been prepared primarily to assist instructors in planning courses for training of oxyacetylene welding and cutting operators. Three chapters: (1) Outlines essential information to be presented in course for training of general welding operator and pipe welding operator; (2) contains, in outline form, material essential to training of various types of cutting operators; (3) outlines essential information that should be given in course for inspectors and specifications of primary requirements of students who take inspectors' course. Paper bound copies, 25c. each.

★ ★ ★

CONSTRUCTION GLUES—**L. F. Laucks, Inc.,** 911 Western Ave., Seattle, Wash. (4-p. brochure illustrated). Describes and lists uses for hundred different kinds of casein, soybean, blood and synthetic resin glues, each adapted to do special gluing job. Water-resistant, self-bonding, quick-setting, these glues are formulated particularly for making stressed-cover wall, ceiling, floor and roof sections, for laminating wooden beams, arches and timbers, for mill and cabinet work and for general dry built construction purposes. Especially important is self-bonding feature of these glues which eliminates necessity of expensive, time-killing and sometimes impossible pressures with clamps and weights. Additional features (1) quick setting; (2) water resistant. Three kinds recommended for use of prefabricators, builders and contractors; (1) Lauxein, self-bonding, water-resistant casein glue; (2) Lauxite synthetic resin adhesive; (3) Lauxite cold-setting synthetic resin glues.

PISTON RINGS—**Koppers Co.,** American Hammered Piston Ring Division, Baltimore, Md. (2 pp., illustrated) Leaflet describes: (1) five specialized rings used in various combinations to correct conditions in worn automotive engines and (2) Koetherizing machine to restore collapsed pistons to original size.

★ ★ ★

ELECTRICAL EQUIPMENT—**Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa. (64 pp. illustrated) "Quick Selector" catalog issued twice a year simplifies selection of electrical equipment for any motor lighting or feeder circuit. Subjects covered are safety switches Nofuze breakers, multi-breakers, panel boards, motor controls and motors. Information includes equipment additions, price changes and application data.

★ ★ ★

JAW CRUSHERS—**Iowa Manufacturing Co.,** Cedar Rapids, Ia. (8 pp., illustrated.) Bulletin A-4 describes and illustrates roller bearing and plain bearing jaw crushers. Different jaw styles and types are shown and chart is furnished for determining average percentage expectancy. Specifications for complete range of sizes from 9x12 in. to 25x40 in. are given.

★ ★ ★

RUBBER TRACKS—**B. F. Goodrich Co.,** Akron, Ohio. (4 pp. illustrated.) Illustrates commercial applications of rubber tracks apart from their use on crawler-type military vehicles and combat cars. Rubber track is made in two types: (1) An endless-band track reinforced longitudinally with steel cables to which transverse driving members are bonded at accurate intervals, and rubber block track of individual segments that may be removed and covered with new rubber.

★ ★ ★

PRECISION MANUFACTURING—**Caterpillar Tractor Co.,** Peoria, Ill. (40 pp., illustrated) Booklet describes mass production precision methods with instruments which work to within few millionths of an inch of absolute accuracy. Descriptions include superfinishing of crankshafts, gear manufacturing, pretesting of steels, track link accuracy, heavy chromium plating, metal hardening by high frequency induction, foundry practices and maintenance of welding quality.

★ ★ ★

SHOVEL-CRANE—**Bay City Shovels,** Bay City, Mich. (12 pp., illustrated) Catalog 62C covers design features, working ranges, safe working loads, job applications, and general specifications for 1-yd. shovel convertible to 17½-ton crane, to dragline or to trench hoe.

★ ★ ★

WRENCHES—**Blackhawk Mfg. Co.,** Milwaukee, Wis. (50 pp., pocket size, illustrated.) Describes and illustrates socket, box-type, specialty and torque-indicating wrenches, their uses and new features. Socket with ¾-in. opening has wall thickness of only 0.0615 in., enabling use in close quarters inaccessible with jaw wrench. Thumb-release lock-on, consisting of plunger and spring, attaches socket to variety of handles. Socket sizes range from ¼- to 1-in. drive. Tork flash wrenches indicate tension applied in tightening nut. Also, box and open-end wrenches. Price lists are included in booklet.

★ ★ ★

WHEELBARROWS—**Garlinghouse Bros.,** Los Angeles, Calif. (8 pp., illustrated) One-wheel and two-wheel models in types and capacities to handle various materials are designed with aim of transferring load in wheeling and lifting from arms and backs of workmen to ball bearing axles and rubber tires of equipment. Bulletin No. 57.

A typical "old timer." Maintenance expense is high and the increased weight and speed of modern traffic has made this bridge dangerous and obsolete.

Sturdy ARMCO Multi Plate keeps costs down and speeds construction. Sections are delivered to the job site ready for immediate assembly by unskilled men.

A wide, safe ARMCO Multi Plate Bridge. It should provide a lifetime of service without upkeep or repairs. Note the attractive native stone headwalls.

MAKE "BAD BRIDGES"

Just a Memory!

Why let unsafe, budget-eating bridges plague your roads? With ARMCO Multi Plate you can free yourself of this responsibility, aid national defense, and perform a real service for the traveling public. What's more, you can do it speedily and at low cost.

Using ARMCO Multi Plate, you can widen or replace an average small bridge *in a few days*, often without interrupting traffic. Your regular crew assembles the sturdy plate sections in any weather without special equipment. Then backfill and finish off with a headwall design you like. The result is a handsome bridge that has ample strength to withstand all highway loading conditions.

Learn how little it will cost to repair or replace your most troublesome bridges with ARMCO Multi Plate. A request will bring complete information. ARMCO DRAINAGE PRODUCTS ASSOCIATION, 205 Curtis Street, Middletown, Ohio.

ARMCO MULTI PLATE PIPE AND ARCHES

PORTABLE ELECTRIC TOOLS—**Independent Pneumatic Tool Co.,** 600 W. Jackson Blvd., Chicago, Ill. (64 pp., two-color, illustrated). Divided into four major sections, catalog gives complete descriptions, specifications and prices on entire Thor line of universal type electric drills, drill stands, screw drivers, nut setters, tappers, saws, hammers, nibblers, grinders, sanders, polishers and electric tool accessories. Illustrated with photographs of tools in operation on various types of work. Featured are Thor ¼- and ½-in. capacity drills, small, light tools for fast drilling. Also new "Thor-Nado" electric hammer and Thor Nibbler for cutting metal.

★ ★ ★

SAFETY STEEL SCAFFOLDING—**Mechanical Handling Systems, Inc.,** Detroit, Mich. (8-p. illustrated catalog). Gives complete details of Quick-Set safety steel scaffolding for various building requirements and explains construction that permits easy assembly and dis-assembly with few strong lightweight parts, thereby minimizing initial investment, storage and handling.

★ ★ ★

CARE AND CLEANING OF HANDS AND ARMS IN INDUSTRIAL PLANTS—**Magnus Chemical Co.,** Garwood, N. J. (24-p. bulletin). Written for use by safety engineers, industrial physicians, industrial insurance men, plant superintendents and other plant men interested in or concerned with control of industrial dermatoses. Subjects discussed: (1) What a hand cleaner should do—what it should not do; (2) safe detergents and scouring agents; (3) germicides and medicants; (4) lime scums and rinsing; (5) cleaning routine; (6) protection of hands and arms on job. Should be of assistance to industrial executives in maintaining healthy condition of employees' hands and arms through use of planned cleaning routines and safe hand-cleaning compounds.

★ ★ ★

POWER FINEGRADERS—**The Buckeye Traction Ditcher Co.,** Findlay, Ohio. (6-p. folder illustrated). Discusses and illustrates new design features of latest model for road and airport construction, including tandem form wheels, hydraulic lifts and heavier frames. Specifications are given on Model RB24F adjustable from 20- to 25-ft. widths and Model RB13F adjustable from 10- to 13-ft. widths. Claims for equipment made by manufacturer include its ability to cut grade to specifications in one pass, elimination of high spots and voids, reduction of hand labor and speed sufficient to prepare grade well ahead of fastest pavers.

★ ★ ★

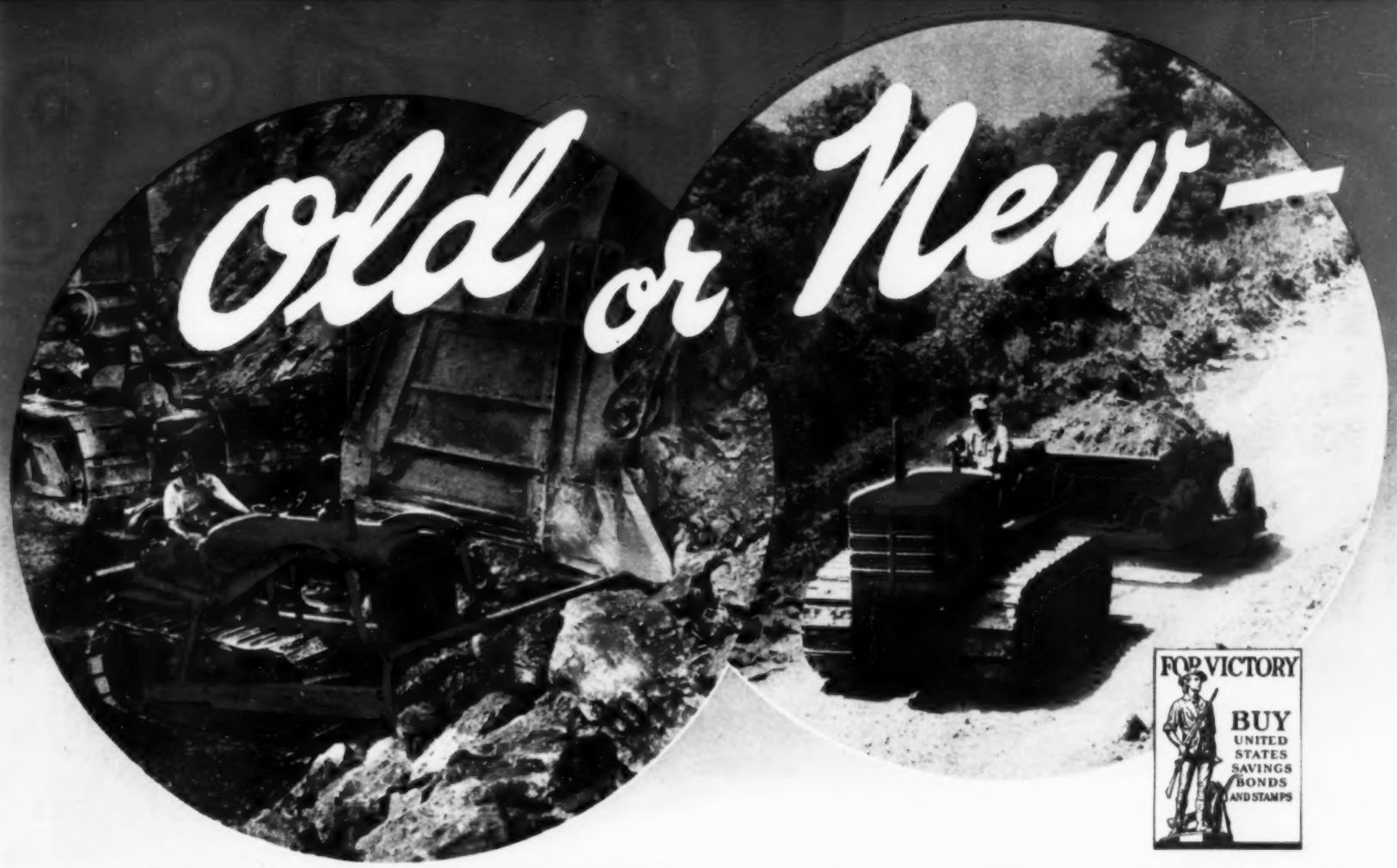
Clearwater Dam

(Continued from page 70)

the White River basin, will be approximately 4,200 ft. long, 150 ft. high, and contain more than 5,000,000 cu.yd. of material. All concrete has been placed in the forebay, intake, diversion tunnel, and stilling basin of the outlet works. The control tower will be completed soon and operating equipment installed.

Construction of the outlet works is being done by the United Construction Co., Winona, Minn., with Walter C. Groshong as general superintendent. Mittry Brothers Construction Co., Los Angeles, Calif.,

(Continued on page 110)



INTERNATIONAL TRACTRACTORS Are "All-Out-for-America"

AMERICA is engaged in a gigantic struggle for the very preservation of the nation. Industry and Agriculture look forward to a VICTORY in which all men and women will share—*and for which every man and woman must fight!*

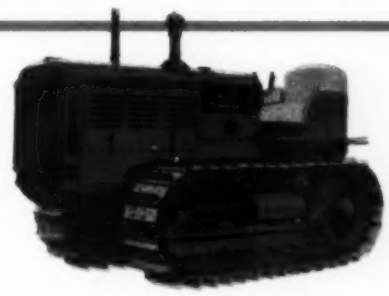
All of us are pulling together to fill a great "all-out-for-America" production assignment. The job calls for every ounce of energy at our command and for maximum output from machines and equipment.

International TracTracTors, *old and new*, are playing a vital role in this March to Victory. They are helping build factories, roads, streets, airports. They're at work in mines and in quarries. You see them in forests and oil fields. All this varied activity is in addition to the ever-increasing number of TracTracTors in the service of the Armed Forces.

International TracTracTors are designed and built for the toughest going. But now, more than ever, even the best machines need servicing—the kind International Industrial Power dealers are equipped to give. Rely on their *trained personnel, modern equipment* and *complete stocks of Genuine IHC Parts.*

Let International Service keep your equipment in first-class working condition. Keep your TracTracTors working for a stronger America—and for VICTORY!

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois



Left: The veteran International TD-40 Diesel TracTracTor. *Right:* The new, powerful International TD-18 Diesel TracTracTor.

OLD or NEW—KEEP 'EM SERVICED!

Users who have standardized on International TracTracTors, Wheel Tractors, and Power Units can now appreciate what International QUALITY and International SERVICE mean. New machines are in limited production. There may not be enough, in some models and sizes, to go around. Those in use will have to work harder and live longer. This calls for the best kind of service, preventive maintenance, and overhaul. It calls for *International Service*—efficient, economical, time-saving.

INTERNATIONAL Industrial Power

(Continued from page 108)

is contractor for the embankment and for excavation for the spillway; O. K. Mittry, president of the company, is in charge.

Clearing of 500 acres in the reservoir area has been started by Ralph Langston, Springfield, Mo. An additional 1,500 acres will be cleared later for the permanent pool for recreation and conservation purposes.

Construction activities in the Little Rock District are in charge of Lt. Col. T. F. Kern, district engineer. Major J. R. Crume, Jr., is engineering and executive officer. Leon M. White is acting resident engineer for the Clearwater project.

★ ★ ★

In 100 Days

Contractor Grades, Drains and Paves

$3,900,000 Airport

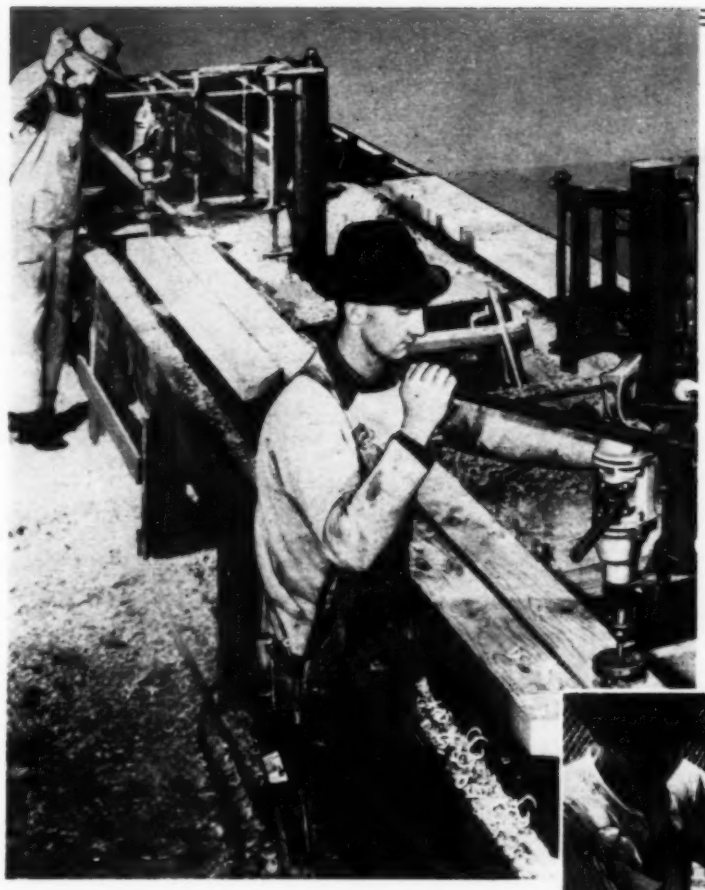
(Continued from page 44)

crete slab lies over sewer trenches. Load tests indicated that the bearing power of the subgrade material could safely be assumed at 40 lb. per sq. in. Care was exercised to make the subgrade uniform in bearing power. Any frost-heave material or spongy spots revealed by inspection were excavated and backfilled with sand-gravel. Sewer trenches under the slab were backfilled in 6-in. layers which were thoroughly compacted.

Drainage System — Although airfield grading involved more than 550,000 cu.yd. of earthmoving, the cuts were comparatively light, ranging in depth from mere surface stripping to a maximum of 4 ft. The natural slopes of the site were utilized in laying out a drainage system which converges at one corner of the field into a 7-ft. outfall discharging into Willow Run, a stream which curves around the entire 1,600-acre tract and gives the bomber plant its name. As graded, the airfield slopes about 10 ft. per mi. from the high side to the low side. The maximum drop is about 13 ft. in 7,500 ft.

An accompanying drawing indicates the layout of field drains better than it can be explained in words. In the area between runways are located subsoil drains of 4-in. pipe laid in parallel lines spaced 33 ft. and 100 ft., c. to c. Along the edges of the runways (and along the center line of the runways where clay comes within 2 ft. of the surface) are placed pipe drains in graduated sizes of 6 in., 8 in. and 10 in. Both field drains and runway drains con-

(Continued on page 112)



HEAVY DUTY DRILLS finish tough jobs faster — such as the Black & Decker model above boring heavy beams for "arch rib" construction.

Successful Contractors say:

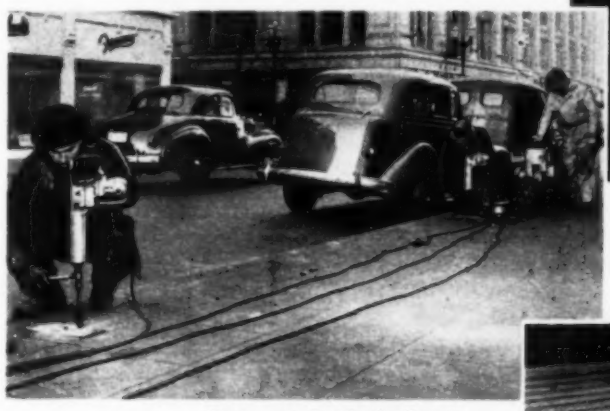
"BLACK & DECKER ELECTRIC TOOLS

Keep Me in Winning Bidder Bracket!"

Contractors are depending more and more on Black & Decker Portable Electric Tools these days, to help slash costs and beat schedules. With Uncle Sam picking up the skilled men fast, it's difficult to keep experienced crews. Smart builders lick this labor shortage, by using additional Black & Decker Tools, so fewer and less experienced operators can perform more work.

BLACK & DECKER Tools are preferred, not only because they're *Quality-built*, but contractors know they can obtain them *right where they're used* — from leading distributors in all principal cities. And, no matter where your "rig" is located, you are only overnight by mail from one of Black & Decker's 26 Factory-owned Service branches, equipped to give you prompt and efficient tool repairs.

If short on men, go long on work output, by providing your crews with more Black & Decker Portable Electric Saws, B & D Hammers, B & D Heavy Duty Drills and Black & Decker Electric Nut Runners. Your nearest jobber can help you tool up with the right model and capacity.



POWERFUL SAWS trimming flooring to help contractor cut sawing costs. Black & Decker Saws are 10 times faster than hand, and save money on dozens of construction operations.

Photo courtesy Dual Parking Meter Co.

ELECTRIC HAMMERS drilling concrete for parking meter installation. Power from portable generator. Black & Decker Hammers also demolish walls, shape and gouge timbers — speed up any hammer-action jobs.

USING NUT RUNNER to tighten flange plate on structural timber assembly. Black & Decker Electric Nut Runners help builders beat schedules on a wide variety of applications.

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Write for these practical Handbooks today, and learn how Black & Decker Portable Electric Tools speed up jobs on dozens of construction applications. Pin coupon to letterhead and mail to The Black & Decker Mfg. Co., 759 Penna. Ave., Towson, Md.

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This booklet shows how to get longer life and top performance from your Black & Decker Electric Tools. Good tools are a big investment and will be increasingly scarce. Get this book NOW!

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker
PORTABLE ELECTRIC TOOLS

(Continued from page 110)

nect into laterals of the trunk sewer collecting system. Drains of 4- to 10-in. size, totaling 330,000 ft. in length, are plain-end double-strength vitrified clay tile laid with open joints in trenches partially or completely backfilled with gravel.

Double strength vitrified clay tile pipe also is used for sewers in sizes up to 36 in. All sewer pipe more than 36 in. in diameter is precast concrete. Pipe for the entire 65,264 ft. of sewer system is bell-and-spigot type, laid with tight joints. Sewers lying 12 ft. or more below finished grade are bedded and backpacked with lean-mix concrete.

Runways

For landing and take-off of bombers, the field has six runways each 160 ft. wide and ranging in length from 4,800 to 6,400 ft. Two parallel runways on 750-ft. centers cross the field on a diagonal in the direction of prevailing winds. At the intersection of one of these runways with two other runways is a large central paved area embracing 10 acres of concrete slab. Including aprons and taxiways, the total area of concrete pavement required for the field amounted to 740,000 sq.yd.

Each runway comprises eight 20-ft. paved lanes of 8-6-8-in. cross-section, the 8-in. thickened edge reducing to 6 in. on a straight taper in 3 ft. The slab is separated into 120-ft. blocks by ¾-in. expansion joints, with transverse contraction joints at 20-ft. intervals between them. A keyed construction joint is used between adjacent lanes, and a doweled longitudinal center-line contraction joint is included in each 20-ft. slab.

Grading

Grading operations of the contractor were carried out with the assistance of the Cheney Wright Co., Williamstown, Mich. To cut off high areas and haul the excavated material to low portions of the field, the grading force operated eleven LeTourneau scrapers, three 18- and eight 12-yd., drawn by Caterpillar 96-hp. diesel crawler tractors. In October, three 12-yd. pneumatic-tired Tournapull tractor-scraper units were added to speed handling of 2,750,000 cu.yd. stations of overhaul. An additional 6-yd. tractor-scraper outfit was employed on miscellaneous services.

Fleets of three to seven tractor-scraper units ordinarily operated out of each cut, with a 96-hp. diesel pusher tractor to assist in loading. When a number of scrapers were hauling out of one pit, they frequently loaded in tandem, sometimes as many as four or five units in a train, with a pusher tractor at the rear. Each tractor was equipped with a large pusher-plate attachment at the front to enable it to act as a booster behind the scraper immediately ahead of it. When lined up in a train at the pit, all the tractors in back of the one or two scrapers engaged in loading contributed their combined tractive effort to speeding up the loading operation.

A cut 700 to 800 ft. long provided sufficient distance for tandem loading of four to five units on a straight push. Loading operations by successive scrapers in a train were synchronized to get maximum load in minimum distance. While the first scraper was being filled, the second unit made a shallow, level cut and plunged for a deep bite as soon as the forward scoop raised its cutting edge to start the haul to the dump. The operation was repeated for successive units in the line.

Except where loaded hauls from the two ends of the cut were equal, loading always started at the end which was the greater distance from the dump and finished at the end which provided the shorter loaded haul. The grading superintendent figured that a return trip by the pusher tractor to the starting end of the cut caused less interference with production than would a longer loaded haul by tractor-scraper units which alternately loaded in a direction away from the dump.

Loading with the help of pushers at the rear, the 18-yd. scrapers consistently scooped up 20 yd. per load, and the 12-yd. units picked up 14 yd. On 2,000-ft. hauls the 18-yd. scoops moved 80 yd. of loose material on four trips per hour. On a haul averaging 1,000 ft. from the cut to the dump, each of the 12-yd. scrapers made better than seven trips and moved 100 bulk yards an hour.

Drainage Construction

Trunk sewers and outfall were the stiffest hurdles to be topped in the race to complete the drainage work in 65 calendar days after starting the first trench excavation. The Porath organization tackled the tough job of putting the 7-ft. outfall in sheeted trench through a 36-ft. cut in the creek bank. This cut took care of 100 ft. of the 900-ft. outfall. The remaining 800 ft. of 7-ft. concrete pipe was laid by the contractor in an open trench of 26-ft. average depth predrained by well points and excavated by tractor-scrapers for the top 15 ft., followed by a dragline for the lower 10 to 12 ft. in hard blue clay. By this method, the contractor averaged 60 ft. of sewer per day.

To assist in constructing other portions of the trunk sewer system, the general contractor called in additional experienced and well-equipped outfits supplied by such firms as Drainage Contractors (John Ventrelle), the Gargaro Co. and Chris Nelsen. Their equipment and methods of operation are shown by accompanying photographs. As for their success, it suffices to say that in spite of unfavorable weather the collaborating contractors completed the main sewer system by the scheduled date of Oct. 15. Installation of field drains was completed later.

Outstanding among the equipment units employed by the sewer constructors were the well points which pulled water out of the fine, running sand above the bottom clay layer. To dewater the ground for excavation by draglines and ladder-type trenching machines the various sewer crews operated 24 well-point outfits, mostly Moretrench, with the remainder made up of Griffin and Jaeger units. To dig the relatively shallow trenches for field drains, the contractors brought in eight wheel-

(Continued on page 114)

Push the tough jobs through on Schedule

HEIL HI-SPEED CABLE SCOOPS — Complete dirt-moving units consisting of 150 H. P. Heil Rubber Tired Tractor and 15-yard-Capacity Heil Twin-Cable Scoop. Designed for high speed operations, with hauling speeds up to 20 M.P.H. depending on road and grade conditions.

WITH HEIL ROAD MACHINERY

A Complete Line of Dependable Earth-moving Equipment to help You Maintain High Speed Operating Schedules

Today's high speed production schedules call for heavy duty construction equipment that will stand up under a punishing day-and-night work program. Speed and more speed is the order of the day — no matter how big the job or how tough the operating conditions may be. That's why it's important for you to have equipment that can be depended on to see your job through 'on time' without delays and service expense.

Heil Road Machinery is built by a pioneer manufacturer of construction equipment and is designed by experts to give you efficient, dependable operation on all types of jobs. Heil offers you a complete line of earth-moving equipment to choose from. You will find the *right* equipment for *your* job in the complete line of Heil Hi-Speed Tractor-Scoops, Heil Twin-Cable Scoops, Heil Trailbuilders and Bulldozers, Heil Hydraulic Dump Units, and Heil Tamping Rollers. See your nearest Heil Distributor or send for illustrated catalog today..... Address:

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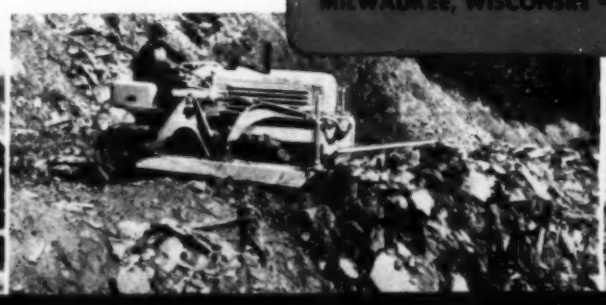
EIL TWIN-CABLE SCOOPS — Fast operating economical Heil win-Cable Scoops are built in 6, 8, 10, 15, 18 and 25-yard apacities, for operation with all makes of crawler tractors. ecify Heil Cable Scrapers to insure trouble-free operation and wer cable replacement costs, regardless of the tractors you use.



HEIL HYDRAULIC TRAILBUILDERS AND BULLDOZERS — Available in sizes for mounting on all Cletrac Tractors. Heil Hydraulic system gives you instant positive control of the blade — in the up, down, float, and hold positions — to insure fast, clean-cut work.

HEIL HYDRAULIC DUMP UNITS — Heavy duty Heil dump bodies and Heil hydraulic hoists are available in suitable capacities for mounting on any truck chassis. See your nearest Heil Distributor for recommendations.

CORRECTION

THROUGH AN ERROR, an earlier article on construction of the Willow Run bomber plant, January, 1942, p. 48, failed to mention six Griffin well-point systems used by the J. A. Utley Co. to dewater trench for its 5,250 ft. of tunnel and several similar systems employed by the Gargaro Co. on some sections of its contract for sewer and water mains.

(Continued from page 112)

type ditchers which were not yet on the job when the accompanying photographs were made. Four ladder-type trenchers, two Buckeye and two Parsons, worked on the sewer trenches, as did also a large number of draglines and a few clamshell cranes.

Runway Paving

It remained for the runway paving work to show the ultimate in clocklike precision and progress. Skilled organization and operation of two batching plants and four paving outfits were responsible for the fast progress. A steady average output of 1½ mi. of 20-ft. slab per day was maintained by the four paving outfits working two shifts of 8 hr. each. Expressed in other terms, the average daily production amounted to 17,600 sq.yd., or 3.63 acres. This rate of production was sufficient to complete 740,000 sq.yd. of pavement, equivalent to 63 mi. of 20-ft. lane, in 42 full working days by the four units.

To push the paving, Julius Porath & Son Co. entered into association with an allied organization made up of two experienced roadbuilding firms, the Lewis & Frisinger Co., Ann Arbor, Mich., and E. B. Schwaderer, Cass City, Mich. The latter organization operated two 34E pavers supplied with dry batches from one batching plant; two similar paving mixers of the Porath concern were batched from a separate plant. Each of the two paving organizations undertook to complete about half of the airport pavement, but no fixed limits were set for the area to be paved by any outfit. Operations were kept on a flexible basis to facilitate rapid completion by utilizing the outfits wherever they could be employed to best advantage.

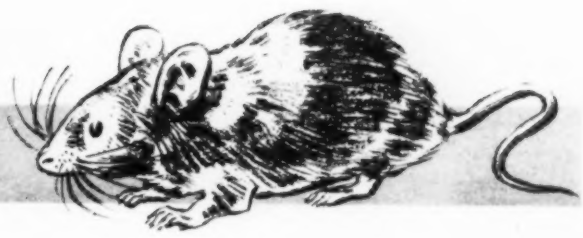
Paving Procedure

Each paving outfit started construction of a 160-ft. width of runway by placing first a 20-ft. lane next to the center line and completed the 80-ft. half width out to the edge of the pavement by adding successive adjacent lanes on the next three trips. To reduce time lost in moving equipment, the contractors followed a plan which kept a paver traveling forward continuously around the sides of a triangle formed by three runways. A sled resembling an oversize stone boat carrying timber rails set on 20-ft. gage moved finegrader, finishing machine, joint machine and longitudinal float from the end of one lane to the beginning of the next. Equipment employed by the four duplicate paving outfits included four Caterpillar patrol graders, four Buckeye RB finegraders, three Ransome and one Koehring 34E dual-drum pavers, four Jaeger finishing

(Continued on page 116)

TOUGH AS A WILDCAT...

mild as a mouse



Purple Strand Form-Set is the toughest, strongest wire rope in commercial use . . . and yet it's not wild or hard to handle.

Reason is that the super-tough steel is preformed (Form-Set) as the rope is being made. Individual wires and strands lie relaxed, don't tend to fly outward or push inward. As a result, the rope as a whole is relaxed, spools better, stands up longer under bending fatigue.

Today wire rope is one of the sinews of war production. For efficiency—use Purple Strand Form-Set.

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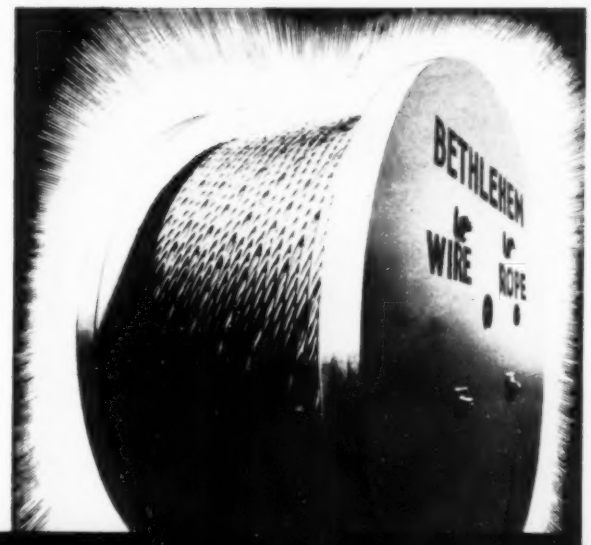


BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

(Continued from page 114)

machines, four Flex-Plane joint machines and four Koehring longitudinal floats.

Pipe lines for water supply were ruled out by the practical impossibility of maintaining lines in service over a field cross-hatched by drainage trenches. Tank trucks of 2,000- to 3,000-gal. capacity hauled water to the paving outfits for mixing and for wetting subgrade ahead of the pavers.

No water was required on finished slab, as the concrete was cured under a cover of waterproofed, reinforced four-ply kraft paper. For curing pavement, the job used 800 rolls of Sisalkraft, each roll measuring 22½ ft. in width by 60 ft. long. Up to Sept. 15, while the weather remained hot, the Sisalkraft cover was kept on the slab for seven days; after Sept. 15 the period of curing under paper was reduced to four days. Figured on a basis of total pavement area to be covered, the 800 rolls of reinforced kraft paper had to average more than six uses to complete the job. Many rolls actually were reused ten times.

Batch Plants

To supply dry materials to its two Ransome 34E dual-drum pavers, Julius Porath & Son Co. set up beside a railroad spur a batch plant consisting of two Blaw-Knox bins and one Blaw-Knox bulk cement plant. The three units were arranged in a row for straight drive-through by the batch trucks, and each unit was equipped with double hoppers to permit one-stop batching of a two-batch truck. Complete charging of a two-batch truck in three stops under the three bins could be accomplished in 15 sec., according to time studies made by Edward W. Porath, secretary-treasurer of the company.

Aggregates delivered by rail were unloaded from gondola cars to stockpiles by two Koehring cranes handling 1- and 1¼-yd. clamshells. A 1½-yd. Northwest crane charged the 100-ton sand bin and 200-ton gravel bin from the stockpiles. Ford cement from the River Rouge plant was delivered to the boot of the bucket elevator at the 350-bbl. bulk cement plant by the George F. Alger Co. in tank trailers equipped with screws for unloading. The trailers carried about 90 bbl. per trip.

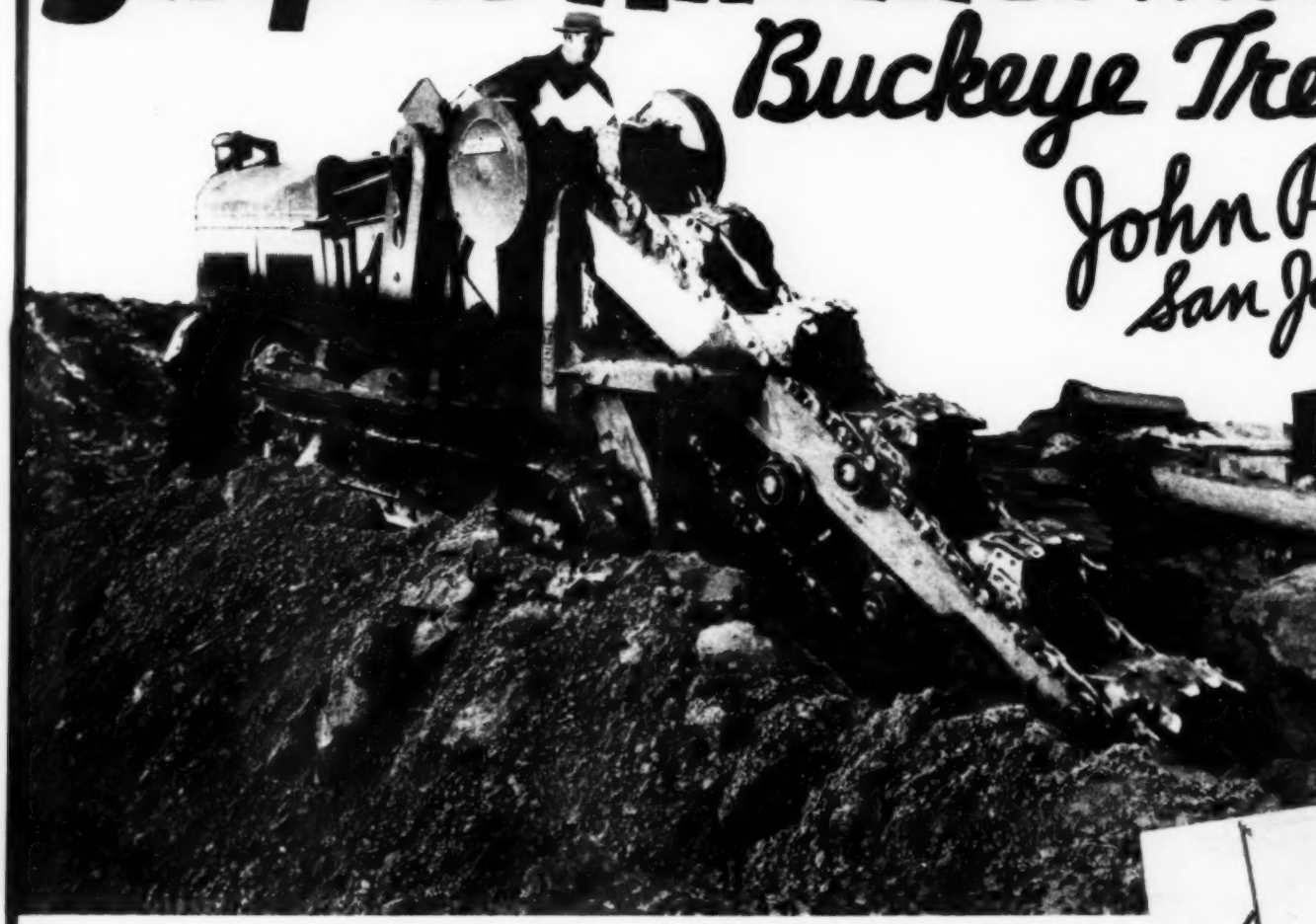
At the batch plant of the Lewis & Frisinger Co. and E. B. Schwaderer, both aggregates and cement were delivered by truck. Separate sand and gravel bins set up some distance apart at this plant were equipped with double hoppers for one-stop charging of two-batch trucks. Two bulk cement plants, a Butler and a Blaw-Knox, were located side by side at an intermediate point between the gravel and sand bins. Each truck made two stops under one of the cement hoppers to take on the two batches of cement.

Ten two-batch trucks served each 34E paver. As the four paving outfits worked two shifts, a total of 80 truck-shifts per day was required. Many trucks, mostly Fords, were rented to supplement the contractors' hauling fleets. Because of the limited capacity of most of the trucks on

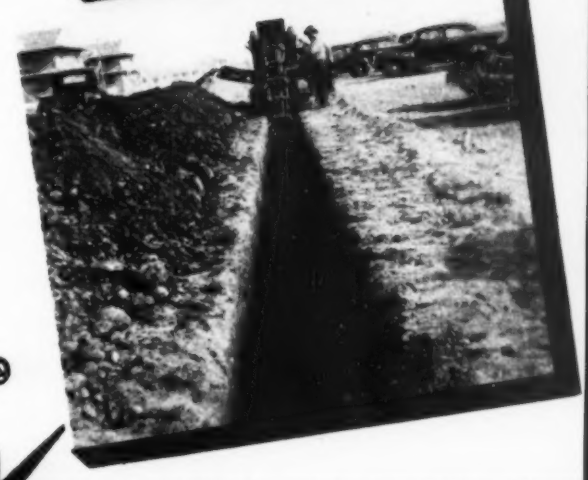
(Continued on page 118)

"Ship Us Another Model 410 Buckeye Trencher"

John P. Powers, San Jose, Calif.



410's are moving up "America's Date with Destiny" on scores of defense projects. Making trench 15" to 24" wide and up to 6' deep (7'6" optional). Only 7'10" wide; 6'8" high. High digging and road speeds. Easy to transport and as easy to operate as driving a truck!



We are naturally enthusiastic about Buckeye Trenchers—all 18 of them in the broad Buckeye line—but permit us to quote from a *bonafide* unsolicited letter which speaks more eloquently than anything we could say—

"We purchased what we believe to be the first Buckeye Model 410 Ladder Type Trencher on the Pacific Coast.

"On the U. S. Army Airport job at Mather Field, Calif., digging trench 24" wide and 5' deep, we averaged 6 lineal feet per minute. The formation was actually hard, being in substance of California "hardpan" impregnated with niggerheads.

"In our years of trenching operations, we have never had a piece of equipment that has made such a favorable impression. Its sturdiness, flexibility and low operating cost appeal to us. Please ship us another Model 410 Buckeye Trencher as quickly as possible."

(*Signed*) JOHN P. POWERS
Service Trenching Company

Contractors on defense, utility, housing projects and municipal trenching tell us, "you've got something there!" Check its 7 advantages that "pay off" on the grade line, in Bulletin 45.

BUCKEYE TRACTION DITCHER CO.
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Built by Buckeye

CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS

CHECK PAGE 9

(Continued from page 116)

the job, the batch size was set at 31.5 cu. ft., entailing a considerable reduction in the ordinary 37.4-cu.ft. capacity of the 34E pavers.

Concrete design called for six sacks of cement per cu. yd. to produce test cylinders with a minimum compressive strength of 3,500 lb. per sq. in. at 28 days. The coarse aggregate was a graded gravel of 1½-in. maximum size. Volume of mixing water was regulated to hold the concrete slump within a specified maximum of 2 in. The actual slump ordinarily ranged from 1½ to 2 in.

On the basis of a 2-percent overrun, which was average for the concrete pavement on the job, a 31.5-cu.ft. batch paved 2.94 lin. ft. of 20-ft. slab of 8-6-8-in. cross-section. For a normal daily run of 1½ mi., the four pavers turned out 2,700 batches. This output meant an overall average of about 42 batches per hour for each mixer throughout the 16 hr. of a two-shift day, without any allowance for shutdowns and interruptions. Specifications required 60 sec. mixing of each batch, and the batchmeters were set to give about 32 sec. mixing in each compartment of a dual drum.

On a normal day in which the pavers were laying 1½ mi. of 20-ft. slab, the two batching plants weighed out about 5,200 tons of sand and gravel and 900 tons of cement. Tank trucks in the course of such a typical day delivered about 240,000 gal. of water to the paving outfits for mixing and for wetting subgrade.

Supervision

Construction of the entire Willow Run bomber plant, including the airport, has been directed for the Defense Plant Corp. by Robert H. Dailey, supervising engineer. For the Ford Motor Co., which operates the plant and which has managed construction in behalf of the Defense Plant Corp., the work has been carried out under the supervision of H. B. Hanson, who is in charge of power and construction in the Ford organization. On the airport, this department of the Ford Motor Co. has been represented by William Dorrance, project engineer. As designer and supervisor of construction for the project, Albert Kahn Associated Architects and Engineers, Inc., delegated George Scrymgeour to act as executive in charge of operations, with Raymond C. Bernardi as superintendent of the entire Willow Run bomber plant and M. Stegeman as superintending engineer on the airport.

Operations of Julius Porath & Son Co., contractor for all phases of airport construction, have been under the overall supervision of Edward W. Porath, secretary-treasurer, and under the more immediate direction of William E. Duffy, general manager, and Glenn Cargill, general superintendent on the airport, assisted by M. M. Martens, grading superintendent, L. Rhodes, drainage superintendent, J. Gothard, paving superintendent, and Simpson Albion, estimate enginer. Paving work of the Lewis & Frisinger Co. and E. B. Schwaderer was directed by Curtis R. Hunt, veteran Schwaderer superintendent.

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Greater Safety *plus* Dependable Performance Helps to Increase Production

Safety, today, is more vital than ever. Every accident means an irreplaceable loss not only of man-hours but of machine-hours—a serious cut in the effectiveness of the country's production equipment.

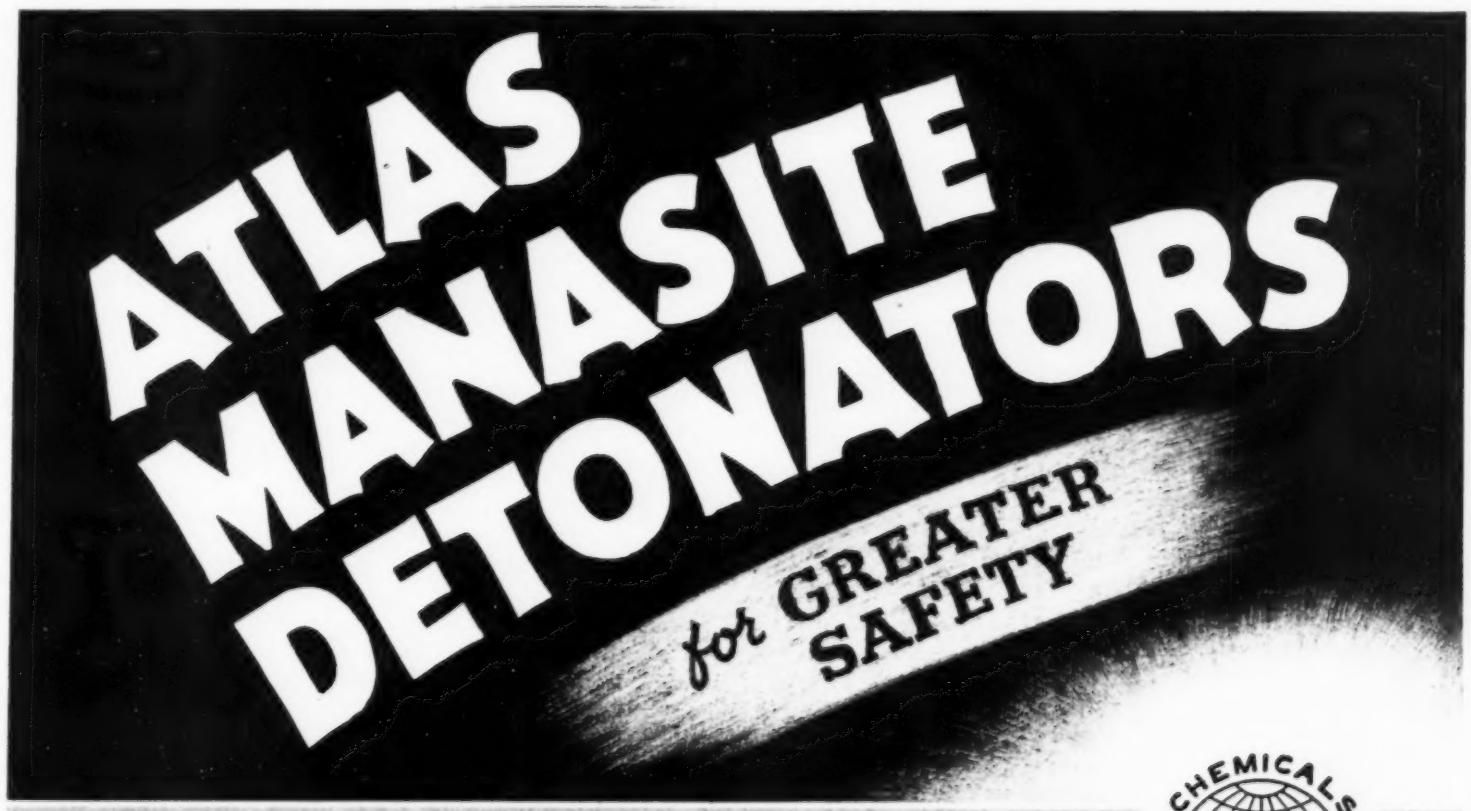
Inadvertent mishandling of explosives and detonators is more probable today—both because of the many new men being put on, and because of the rush for production.

By helping to avoid such accidents, Atlas Manasite Detonators are doing their part to increase production.

Atlas Manasite is the result of years of experience in making blasting caps. Before Manasite was introduced, Atlas made hundreds of millions of detonators—good detonators, as reliable and as relatively safe as any produced at the time. Then, through chemical research, Atlas changed the blasting-cap picture. With Manasite, an exclusive method of manufacture—plus the use of hexanitromannite as a detonating agent—substantially increased the margin of safety. While no blasting cap can be called "safe," Atlas Manasite Detonators make safety precautions more effective than ever.

Today, with increased production a "must," can you afford to overlook this advance in safer blasting?

MANASITE—Reg. U. S. Pat. Off.



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Plywood Panels FOR BLACKOUT SCREENS

(Continued from page 39)

use, they are placed on the inside of the panes and usually overlap the casings. Whenever plywood is placed outside the windows and is to remain exposed to the weather for an indefinite time, only the Exterior (waterproof) type is recommended for use.

In industrial plants small nails are driven into casings to hold the plywood panels. Where the sheets must be removed, various methods have been followed. Probably the installation most effective is that of nailing a narrow furring strip on each side of the casing and placing turnbuckles near inside edges. Then the blackout panel can be slipped in place and held there by the latches.

One of the effective and simple means of installing panels in the home without marring casements involves the use of masking tape, a gummed paper tape an inch or more wide. If the panel is carefully cut to fit tightly inside the casing, the masking tape is merely put along the edges of the panel to hold it in place.

★ ★ ★

Anti-Bombing Barricades Made of Bagged Sand-Asphalt Mix

(Continued from page 64)

strength when pressed against damp sand and frequently wet by winter rains. In short, barricades whose durability was dependent upon wet burlap would require repeated renewals—and burlap sacks are becoming more difficult to get.

San Francisco solved this problem by developing an asphalt-sand mix, relatively inexpensive and yet so strong that the barricades will stand even if all the burlap is torn or rotted away. The formula is a 3-percent, (by weight) admixture of 60-penetration paving asphalt, mixed with hot sand (about 250 deg. F.) before sacking. This proportion was the result of experiment with higher and lower asphalt percentages. With less asphalt the mix

becomes too friable and with too much asphalt the mix is unnecessarily sticky. With a 3-percent admixture and an amount of compaction such as can be given by having the workmen walk over and tramp down the mix after it has been sacked, the material hardens after placement in the barricade to something quite like a soft sandstone.

Barricade Tests

Tests with Army service rifles showed that projectiles penetrate in ordinary sandbag barricades about twice as far as in the asphalt-mix. Moreover, from the ordinary barricades a great deal of dry sand runs out after shrapnel or other missile rips away the burlap. The asphalt sand mix retains its shape perfectly even after sacks have been cut for their full length.

San Francisco uses the standard equipment of the paving-materials plant (such as most cities and paving contractors own) for heating and packing. The usual batch is made up of 970 lb. of sand and 30 lb. of asphalt. Hot sand is dumped into a pug mill, the hot asphalt is thoroughly mixed with the sand and the mixture is then discharged into a hopper with a gate at the bottom. Just below the gate a spout to fit the mouth of the burlap sack directs the flow of material. When about 160 lb. of the mix is in each sack—it is important that the sacks be filled to only 60 percent of capacity so as to leave the required space for effective moulding in tamping and placement — the gate is closed and another sack is fitted around the spout. In this manner a two-man crew can fill about 200 sacks per hr.

How Barricade is Built

Prepared in this way, the sacked mixture remains plastic for several hours, allowing ample time for trucking from the paving plant to whatever part of the city requires the barricade. As the sacks are piled in place, care is taken to lay them in alternate "header and stretcher" positions, as in brick laying, or otherwise to provide an interlocking pattern. The workmen are kept walking about over the top of the pile as it is being built up, thus forcing the plastic material in each bag into the spaces between the bags below and shaping each layer of bags to develop full bearing, despite irregularities, on the supporting surface. When a pile built in this manner cools and hardens, which ordinarily requires 5 to 7 hr., the material in each bag is firmly bonded in place and thereafter continues to fulfill its function in supporting the structure without dependence upon the burlap which held it together prior to hardening.

If the barricade is to be built up to a height of more than 10 or 15 ft., a few hours' time is allowed for the lower layers to harden so that unit compression stress will not be too great on material that is still plastic. Barricades of this type can be made with vertical faces, as compared with the somewhat battered faces recommended when dry sand is used. To avoid settlement of foundation and consequent

(Continued on page 122)

(Continued from page 121)

tilting of the pile, if the barricade is to be made on bare earth, the San Francisco practice has been first to excavate a few inches and lay an asphalt mat or pier.

Advantages of Sand-Asphalt Mix

Despite the fact that the burlap is not an essential to durability of the barricade, the fact that materials go into place while quite hot, and are therefore thoroughly dry, greatly increases the life expectancy of the burlap as compared to what it would be if it were placed in contact with cold, wet material. It was this consideration, as well as the cost factor, that led to the preference for asphalt as compared to cement-stabilized sand which was considered before the advantages of the asphalt mixture were understood.

San Francisco costs for materials, as of January, 1942, were as follows: Burlap bags, $7.50 per hundred; sand 75c per ton; asphalt $7.50 per ton. Tests showed that a fine-grained sand gives better results than where coarse-grained sand is used.

A. D. Wilder is director, Department of Public Works of San Francisco; Preston W. King is superintendent of streets, and Herman Dobelman is in charge of the plant where the paving materials are mixed.

★ ★ ★

Defense Housing

Uses Walls of Prefabricated Plywood Panels

(Continued from page 55)

ing assembly line every day and delivered to the project. In the prefabrication, the company utilized its own plyboard, the fabric-covered style for the interior surfaces and the bare exterior grade for exterior walls.

The houses are of three different types of floor plan and of two different sizes, 24x64 ft. and 24x52 ft. Roofing is standard sheet mineral surface asphalt. All floors are fir, with linoleum in kitchen and bathrooms. Exterior is painted with three coats of lead and oil. Interior is painted with two coats of lead and oil in bathroom and kitchen and one coat of resin emulsion in living room and bedrooms. Because of the fabric covering on the interior walls, one less coat of paint was permitted by the housing authorities than would have been required otherwise.

The houses are placed in broken curves

(Continued on page 124)

Continuous Mixing

Why did Barber-Greene build a continuous mixer instead of the conventional intermittent batch type? The answer is in the diagram of the Barber-Greene shown above. At the upper left, the graded, and accurately measured aggregate continuously enters the pugmill in a small stream. In entering, it falls through the spray chamber where it is continuously sprayed with a small stream of metered bitumen. The combining process has started, even before the materials enter the pugmill. The need for preliminary dry mixing is completely eliminated. The Barber-Greene does not have to undo the segregation caused by dumping batches into the mill. In fact a cross section of the mix extracted just a few inches beyond the charging end of the pugmill contains the correct amount of each size of aggregate with the correct ratio of bitumen.

Here the propelling and retarding paddles work the material through the pugmill under pressure, using friction to take the excess from the fines and evenly coat the coarse material.

As the mix is constantly worked through (from left to right in diagram) there can be no dead material, even at the very bottom.

The Barber-Greene uses more horse-sense, and less horse-power. It attains complete homogeneity the easiest, most logical way. It has not only established new standards for accuracy and uniformity, — but has changed moving and erection from a major project to a simple low-cost maneuver. Barber-Greene Company, Aurora, Illinois. 42-1

BARBER BG GREENE

(Continued from page 122)

on the sloping site which overlooks Manette inlet to Puget Sound. Thus the "barracks" appearance is skilfully avoided. Architectural treatment is plain and straightforward, with attractive detailing, including louvers for gables, corner window boxes and rounded concrete steps.

★ ★ ★

Balloon Forms FOR TWIN-IGLOO HOUSES

(Continued from page 47)

embedded in the concrete are steel hooks which are used to anchor sections of small pipe bent to the same arc as the circular base's circumference. The flat side of the uninflated balloon is next laid out on the concrete base. Entirely around the base, or flat side of the balloon, is a series of grommets, or eyelets, and these are tightly laced to the hook-anchored pipes with rope to hold the balloon firmly in place. The balloon is now ready for inflation from an air line to a pressure of approximately 1½ lb. per sq. in.

When fully inflated, the balloon is dusted with a compound to prevent concrete from sticking to it. The whole hemisphere next is covered with 2-in. 16-gage welded wire mesh, to serve as a bond for the concrete, which is shot over the entire balloon to a thickness of approximately 1 in. by the Gunite process. Framework for doors, windows and other desired apertures are fixed in place before applying the Gunite, so concrete can be shot around them, making the frame an integral part of the shell.

The concrete used has a high strength factor and sets quickly. It takes from 2½ to 3 hr. to shoot the concrete for the shell and 24 hr. later the balloon may be removed and set up for the next section.

Shell is Insulated

The outer surface of the resultant inner-shell is vapor-sealed with an asphaltic base compound, applied by stiff brush, and the structure is ready immediately for application of insulation. Insulation in the form of ground pulp in an asphalt emulsion may be sprayed on to a thickness of approximately 1½ in., or a specially prepared blanket of the same thickness of balsam wool may be applied in even shorter time. Over the insulation again is placed a covering of wire mesh and the final coat of Gunite is applied to a thickness of be-

(Continued on page 126)

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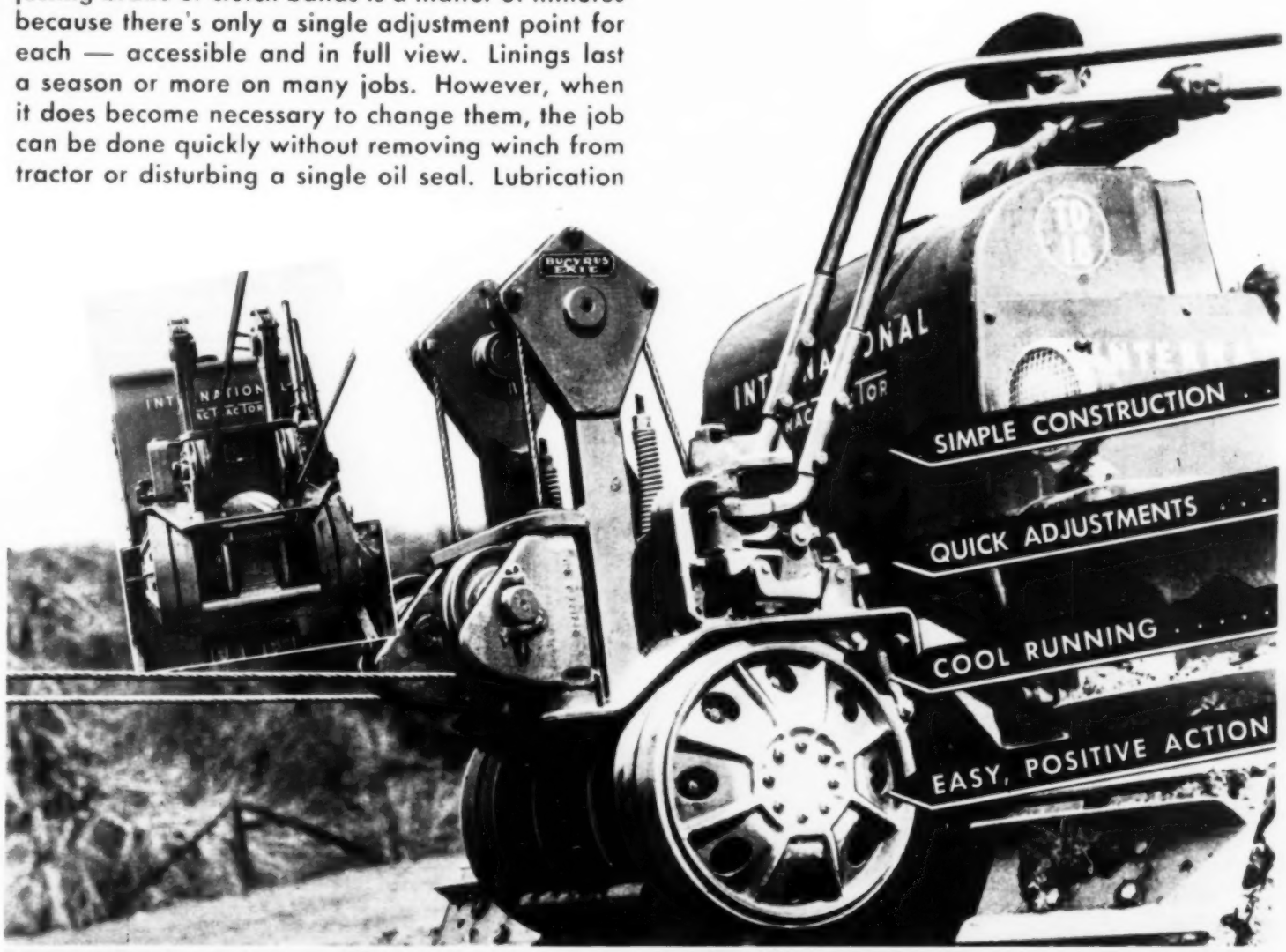

For BUCYRUS ERIE TRACTOR EQUIPMENT

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(Continued from page 124)

tween 2 and 3 in. After the outer layer dries, the building may be painted any desired color with paints which permit breathing, so that any trapped moisture may escape.

Gunite consists of standard portland cement and sand mixed dry and carried from the mixer by a conveyor into the air lock of the cement gun. The mixture is forced through rubber hose to the nozzle in dry form. Another hose brings water to the nozzle and hydration takes place as the concrete ingredients are emitted together.

The balloons are of tough rubberized cotton fabric construction, similar to that employed by the Goodyear company in the production of automobile and truck tires.

★ ★ ★

Highway Tunnels

Mucked by

Slusher Bucket Rig

(Continued from page 62)

bo, equipped with platforms at two levels, was mounted on a motor truck which moved it to and from the face between blasts. The platforms were provided on each side with hinged extensions that could be folded down to provide side clearance during movement of the jumbo. For the full-face tunneling operations, as distinguished from the pioneer bores, mucking was done with a Lima ¾-cu.yd. power shovel, equipped with a short boom, which loaded into Koehring 3½-yd. Dumptor trucks. Blasting was done with DuPont explosives, the powder factor being 3½ lb. per cu. yd. Depth of round pulled ranged from 12 to 14 ft., and yardage pulled per shot was 308 cu.yd. Mucking time per round was about 6 hr. Work was carried on 16 hr. per day.

Several sections of the tunnels required timbering, in the form of seven-segment arches and wall plates of 12x12's set on 5-ft. centers and requiring 0.885 b.ft. of lumber in each set. In one of the illustrations is shown a 300-ft. length of timbered tunnel.

In the small pioneer bores, 7½x6½ ft. in cross-section, driven to provide ventilation before a start was made on the full faces of the bores, a special mucking rig of the slusher bucket type was devised by Ed. Honnen, the contractor. As illustrated in the accompanying sketch, it consists of two cars, each of 12-cu.yd. capacity, with a hinged apron on the forward end and a 2-drum electric hoist on the rear end. From this hoist a drag cable passes over the cars, around a sheave carried by a hook anchored in the rock face and is at-

(Continued on page 128)

(Continued from page 126)

tached to a slusher bucket. From the other end of the bucket a drag cable extends back to the hoist. By pulling on the drag cable the bucket is moved over the muck pile, pulling its load up the inclined apron and into the cars. The haul-back cable brings the bucket back over the muck pile for a new load. The capacity of the two-car unit is sufficient to take care of the muck from one round of firing in the pioneer bore. When all muck from a round has thus been loaded by the slusher bucket the cars are pulled out of the tunnel to the dump by a cable from a hoist at the tunnel portal. The cars are equipped with swinging doors for side-dumping, as illustrated in one of the pictures. The dumped tunnel muck is distributed to form a fill for the new highway by means of a bulldozer on a Caterpillar tractor.

For the Colorado Highway Department Charles D. Vail is state highway engineer, D. W. Ormsbee, construction engineer and F. W. Miller engineer in charge of the job at the Denver office of the highway department. For the Ed. H. Honnen Construction Co., of Colorado Springs, Tom Taylor served as superintendent.

★ ★ ★

Movable Canvas Tent Protects Concrete Paving of Pit River Bridge Deck

(Continued from page 67)

ride on the wire cable. Thus the canvas has support at intervals of 6 ft. 8 in. To distribute the pull from these hooks, an "over" rope runs from the hooks, at right angles to the center line, to the roadway edge and there terminates in tackle with which the canvas is drawn tight and fastened to outriggers on the bottom of the steel bridge stringers.

The 380-ft. length of canvas cover is designed to provide weather protection for three phases of work on the deck slab: (1) concrete form building; (2) placement of reinforcing steel; (3) concrete paving. Special sections of the canvas cover, made up for either end of the covered portion of the deck, provide means of closure that prevent wind from driving lengthwise through the long tent.

The canvas awning was supplied by the J. L. Stuart Mfg. Co., San Francisco, to Crause & Sanders, Detroit, paving sub-

(Continued on page 130)

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THEW CENTER DRIVE

3/8 to 2 1/2 yd LORAINS

(Continued from page 128)

contractors under the American Bridge Co., general contractors on the Pit River Bridge superstructure. The work is being done for the U. S. Bureau of Reclamation as part of the Central Valley project. Ralph Lowry is construction engineer for the Bureau.

★ ★ ★

Tubular Steel Columns Carry Craneways At Shipyard

(Continued from page 54)

to accommodate hulls specified in current Navy contracts left very little clearance between the ways for the supporting structure of the craneways. These space limitations led to the choice of the unbraced, 8-ft. cylindrical columns which are anchored by 2¾-in. bolts, each 16 ft. long, to concrete slabs capping the old pile clusters. The columns, therefore, form vertical cantilevers. With space between the ways so constricted, passageways for the movement of workers were formed by cutting arched openings, 6 ft. wide and 8 ft. high, in the bases of the columns and framing these openings in structural shapes welded to the cylindrical walls to carry the crane loads, as illustrated in one of the photographs.

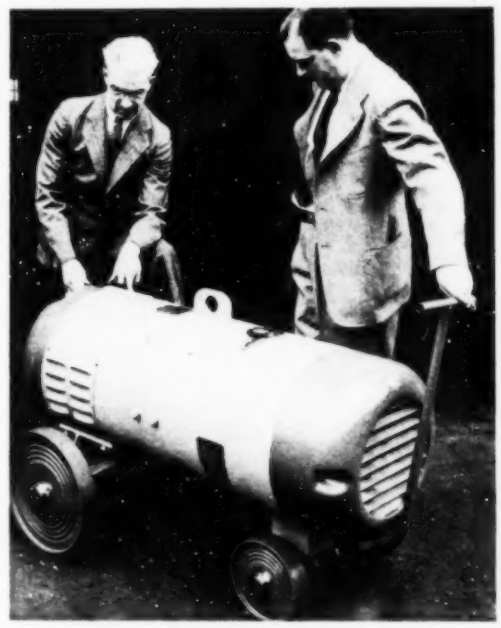
Columns Fabricated Horizontally

The 8-ft.-diameter columns were fabricated in a horizontal position by welding plates varying in thickness from 5/16 in. at the top to ½ in. at the bottom. Circumferential joints are formed by butt-straps, 4 in. wide, on the outside of the cylinder. On the inside, circumferential seams between abutting plates are welded for lengths of 4 in. at 12-in. intervals.

Completed columns, each weighing 25 tons, were up-ended on their pile supports by two crawler cranes. Before being raised to a vertical position the top of each column was equipped with a gallows frame for erecting the crane-rail girders, which varied in height from 9 ft. 3 in. (for single girders) to 8 ft. 5 in. (for double girders). All girders were fabricated by arc-welding and were welded to seats on the column tops. Each craneway is designed to carry a moving load of 165,000 pounds.

The cranes were designed by William A. Sandberg, of Los Angeles. The Lacy Mfg. Co. fabricated and erected the first two ways and the Consolidated Steel Co. was awarded the contract for the crane over the third shipway.

CONSTRUCTION EQUIPMENT NEWS . . . *Continued*



SINGLE PRE-SET CURRENT ADJUSTMENT with arc control is feature of this new portable d.c. Flexarc welder available in ratings of 200, 300 and 400 amp. with 220-, 440- or 550-v. a.c. motors. J. H. Blankenbuehler (left) and D. L. Hadley (right) designed unit.—**Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.**

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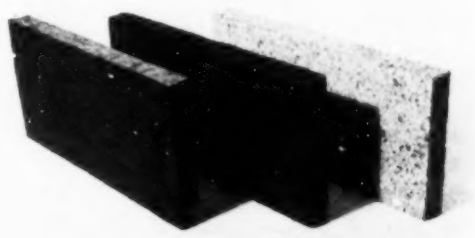

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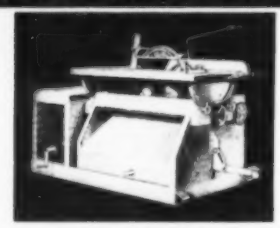

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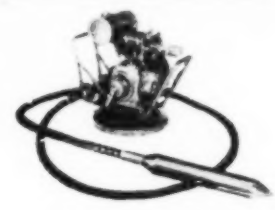

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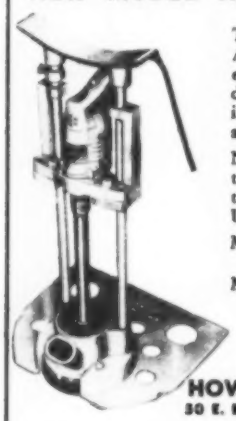

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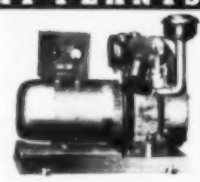

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And sheave diameters are very important too. *If the sheave is too small, the sharp bend imposed upon the rope induces high bending fatigue and early rope destruction.* To appreciate the importance of using correct diameters note that a 1" rope of 6 x 7 construction requires a 42" sheave while a 1" rope of 6 x 41 construction requires but an 18" sheave.

For average operations here is a table setting forth the proper minimum sheave diameters for ropes of varying constructions:

for 6 x 7 Construction	42 times diameter of rope
for 6 x 19 Seale Construction	34 times diameter of rope
for 6 x 16 Filler Wire Construction	30 times diameter of rope
for Flattened Strand (Type B & G)	30 times diameter of rope
for 8 x 19 Seale Construction	26 times diameter of rope
for 6 x 19 Filler Wire	26 times diameter of rope
for 6 x 22 Filler Wire	23 times diameter of rope
for 8 x 19 Warrington	21 times diameter of rope
for 8 x 19 Filler Wire	21 times diameter of rope
for 6 x 37 Seale	18 times diameter of rope
for 6 x 41	18 times diameter of rope

Paying attention to your sheaves pays dividends in longer rope wear, less trouble and steadier production. Specifying **TRU-LAY PREFORMED** pays dividends in the same way. Consult your nearest American Cable wire rope engineer. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

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ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

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This two-fisted, rugged rock drill stays on the job longer — with no air-wasting "back-talk."

Worthington's Blue Brute Rock Drill (WJ-55) saves *your* breath, too, for you don't waste hell and damnation on a tool that is easy on the operator and rarely interrupts the work for maintenance and repairs.

All Worthington Blue Brutes are like that. Rock drills and air tools, designed for a complete range of jobs . . . from hardest rock to clay or fitchery earth . . . *use less air*, cause less trouble, save time and money in the long run. Portable and semi-portable compressors . . . gasoline-driven, diesel, electric . . . equipped with Worthington's time-tested "Feather Valves" . . . *deliver more air*, more smoothly, more economically.

Get a demonstration, *now, on your present job*, of how Blue Brutes will help you get more WORTH from air!

FREE EQUIPMENT SAVER

Ask your nearest Worthington distributor, listed on page 132, for the free EQUIPMENT SAVER which shows you how to conserve scarce metals, lowering maintenance costs for all Blue Brute users from coast to coast. If your distributor is not listed, let us send you this free cost-cutting aid to efficient production direct from Holyoke.

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A Worthington Blue Brute WJ-55 Rock Drill, on trial at a western quarry, made such a hit with the operators that they tried to keep it by *hiding* it when the trial was over! Said the Super, after buying: "It out-drills all our competitive makes by 2 or 3 inches per minute."

On hundreds of army, navy, air-force and ordnance projects all over the country, Blue Brutes are at work.

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